MAY 1990

SURVEY OF ELECTRONIC DATA INTERCHANGE SERVICE IN NORTH AMERICA

INPUT®

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Table of Contents

I	Introduction	1
	A. Study Objective	1
	B. Research Methodology	1
II	Executive Overview	3
	A. Trends	3
	B. Competitive Environment	6
	C. Recommendations to NTT	6
III	EDI Market Conditions	9
	A. Background	9
	B. Role of Standards	10
	C. Benefits of Using EDI	10
	D. EDI and Other Data Communication Applications	11
	E. The Role of Value-Added Networks	12
	F. The Role of Software	14
	G. Leading Industries Using EDI	14
	H. User Trends in Adopting EDI	15
	1. Reasons for Implementing	15
	2. The "Hub and Spoke" Phenomenon	15
	3. Customer Premise Data Format Translation	16
	4. User Platforms	16
	5. Use of Networks	16
	6. International Usage	17
	7. EDI and EFT	17
	8. Relationships with Trading Partners	18
	9. EDI Use Grows in Two Dimensions	19
	10. Parallel Paper and Electronic Systems	19
	I. Common Implementation Procedures	19
	J. Forces Driving the EDI Market	20
	K. Forces Inhibiting the EDI Market	21
	L. Competitive Environment	21

Table of Contents (Continued)

IV Technical Trends 25

A. Standards 25
1. Background 25
2. Summary of Trends 31
a. Migration to ANSI X12 31
b. X12 and EDIFACT 31
c. X12 and X.400 32
d. Real-Time EDI Standards 32
3. Communication Protocol Standards 34
B. Network Services 36
1. Summary of Trends 36
a. Mergers and Acquisitions 36
b. International Expansion 37
c. Internetworking 37
d. Partnerships with Banks Formed to Provide EDI/EFT Services 38
e. Real-Time Communication Sessions for EDI 38
f. Data Transmission Becoming a Commodity, Low-Profit Business 38
g. New Value-Added Services Are Being Introduced 38
h. The Offering of Software 39
i. The Offering of Systems Integration Services 39
j. The Offering of Educational and Consulting Services 39
2. Commonalities in Successful Service Provider Offerings 39
C. Software Products 40
1. Summary of Trends 40
a. Migration of Value-Added Network Services to Customer Site Software 40
b. Event-Driven and Real-Time EDI Architectures 41
c. EDI Interfaces Built into Application Programs 41
d. Inexpensive EDI Software Designed for Single Trading Community, "Turnkey" Implementations 41
e. EDI/EFT Software 42
D. Professional Services 42
1. Background 42
2. Market Segments 42
a. EDI Software Development 43
b. Consulting 43
c. Education and Training 44
d. Systems Operation 45
3. Trends in EDI Professional Services 45

Table of Contents (Continued)

A Appendix: Standards Organization Profiles 47

1. Transportation Data Coordinating Council 47
2. American National Standards Institute 49

B Appendix: Major EDI Service Company Profiles 59

1. AT&T 59
2. Bell Atlantic 67
3. GE Information Services 73
4. Telenet/Sprint International 91
5. IBM Information Network 117
6. BT Tymnet 145
7. MCI Communications Corporation 159
8. Sterling Software/Ordernet Services, Inc. 169

C Appendix: Major Computer Hardware Vendor Profiles 181

1. International Business Machines Corporation 181
2. Digital Equipment Corporation 185
3. Tandem 189
4. Stratus Computer, Inc. 195

D Appendix: Major EDI User Profiles 199

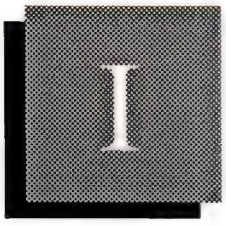
1. Bank: Wells Fargo & Company 199
2. SWIFT 201
3. Retailer: Mervyn's 205
4. Distributor: Lewis Galoob Toys, Inc. 209
5. Manufacturers: Hercules, Inc. 213
6. Gates Rubber Co. 219
7. Department of Defense: U.S. Marine Corps 223
8. Federal Agency: General Services Administration 227
9. Travel Agencies: Tri World Travels 231
10. American Society of Travel Agents 235
11. Carriers: Yellow Freight 239
12. American President Companies 243
13. Medical: Memorial Sloan Kettering Hospital 247
14. Education: University of Texas, Austin 251
15. Utilities: Pacific Gas & Electric 257
16. Southern California Edison 261

Table of Contents (Continued)

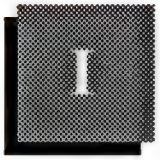
17.	Insurance: Lincoln National Corporation	265
18.	The Aetna Casualty and Surety Company	269
19.	Telecommunications: Pacific Bell	273
20.	U.S. West	277
21.	Freight Forwarders: The Harper Group	279
22.	The Fritz Companies	283

Exhibits

III	-1	Definintion of EDI	10
	-2	Benefits of a Third-Party VAN/RCS	13
	-3	EDI Market Forecast	22
	-4	EDI Network Service Market Shares, 1989	23
	-5	EDI Software Vendor Market Shares	24
IV	-1	Three Kinds of EDI Data Formats	26
	-2	ANSI X12 Structure	28
	-3	X12 Terminology	29
	-4	EDI Format Versus Paper Format (Invoice)	30
	-5	Trends in EDI Standards	31
	-6	ASC X12 Organization	33
	-7	Communication Protocols Used for EDI Today	35
	-8	Communication Protocols to be Used for EDI in the Future	36
	-9	Trends in Network Services	37
	-10	Trends in EDI Software Offerings	40



Introduction



Introduction

A
Study Objective

The objectives of this study are fivefold:

- To understand the general situation of EDI service in North America, specifically in the United States.
- To determine the trends in the use of standards, particularly OSI, for EDI messages and the networks that transmit them.
- To examine the market in terms of suppliers of EDI services, networks, software, and hardware.
- To analyze the use of EDI and associated services by users in major industry sectors.
- To determine the technical characteristics of the products and services supplied for EDI.

B
Research Methodology

The data and information that was gathered for this report came from two general sources.

- INPUT interviewed vendors, users, and standards organizations stipulated by NTT. Specific topics were discussed and data collected according to the requirements outlined by NTT in the proposal.

  Altogether, seven service providers, four hardware vendors, and 22 user companies were interviewed. The interviews followed a structured format of topics. The interviews are contained in the appendixes of this report.

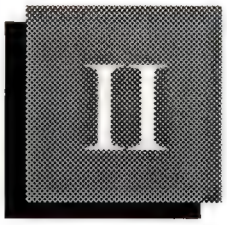
- In addition to specific interviews, INPUT incorporated results from its existing and ongoing research activities in EDI. These activities include:

  - EDI program research—INPUT publishes a series of reports every year on EDI. The ongoing research for these reports involves surveying users and vendors with structured questionnaires. Relevant findings from this research are reported in this study.

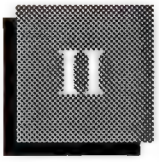
  - Custom research projects for other clients—INPUT has participated in numerous custom EDI research projects. Although no proprietary information has been used in this study, general information and the general industry knowledge gained has been included.

  - User and vendor interviews—INPUT regularly interviews active and prospective users of EDI, vendors, and standards body representatives to determine market trends, issues, activators, and inhibitors. The relevant findings of this primary research are reported in this study.

  - Product, service, and industry analysis—INPUT regularly collects and analyzes marketing literature and information on EDI services and vendors planning EDI services, and reviews trade periodicals and other secondary sources.



Executive Overview



Executive Overview

A Trends

The North American EDI market is small, but growing steadily.

- Approximately 10,000 companies in North America use EDI.
- Total 1989 expenditures by these companies for EDI-related network services, software, and professional services was $280 million.
- INPUT estimates that the market will grow 37% per year and will reach $1.4 billion by 1994.

EDI usage has been fragmented across industries and data format standards, but consolidation and integration is increasing.

- Most industries, government, and educational institutions are using some form of EDI.
- Leading industries are transportation, transportation services, manufacturing, and retail/wholesale distribution.
- Some sectors (e.g., education, insurance, and financial services) are still using non-standard data formats.
- EDI use is still primarily confined to single industries and does not occur among multiple industries.
- EDI grows in clusters—a large company conducts EDI with several suppliers.

International EDI usage is low and confined primarily to transportation and distribution.

- Although international usage is negligible at this time, large users are requesting it. International EDI is expected to grow rapidly in the next two to five years.
- Some large American retailers are conducting EDI with suppliers overseas.
- Transportation organizations (shipping lines, freight forwarders, couriers, and customs authorities) are those most actively pursuing international EDI.
- A few large conglomerates/multinationals are currently conducting international EDI in small, experimental projects.
- Other than transportation companies, no other companies are known to be conducting EDI directly with Japan. However, interest among U.S. pharmaceutical companies is high.

Electronic settlements are in their infancy, but are expected to grow rapidly.

- Electronic payment for commercial transactions is still in its infancy, but may be adopted rapidly by major EDI users over the next two years.
- The automobile industry is currently the only large-scale user of EDI/EFT payments.
- In the last six months, many EDI service providers have teamed with large banks (or bank consortia) to offer payment services. The network services will transmit payment instructions to the banks. The banks, using their own networks, will transfer funds.
- The banking industry will get into EDI indirectly through alliances with service providers. Its electronic data network will most likely not be developed into a full-service EDI network.

EDI data formats are consolidating into two general standards families, but industry-specific "flavors" are still retained.

- Data formats are increasingly being standardized under the single standards family of the American National Standards Institute (ANSI) X12. The industry-focused data formats that were developed in the 1970s and early 1980s (such as the Uniform Communication Standard, Warehousing Industry Network Standard, and the Transportation Data

Coordinating Council standards) are being turned over to the ANSI X12 Accredited Standards Committee for management and future development.

- EDIFACT and ANSI X12 will peacefully coexist despite having different syntaxes. The corporate members of the X12 organization represent North America's constituency that votes on the United Nations-sponsored EDIFACT standard (EDI For Administration, Commerce, and Trade). Thus, X12 users have a direct influence on the development, approval, and disapproval of EDIFACT standards.

- The multiplicity of data format standards (UCS, WINS, X12, TDCC, EDIFACT) is not dimishing the vitality of EDI growth. Although small companies considering an EDI installation have expressed some confusion over standards, most experienced EDI users believe that multiple standards can coexist.

- It is expected that multiple standards will continue to exist for the next five years at least. Each standard will be used where it is most appropriate: TDCC in transportation, EDIFACT in international trade, ANSI X12 for generic domestic commercial exchanges.

Users and vendors are gradually adopting the OSI communication protocols, but a diversity of protocols will dominate the landscape throughout the 1990s.

- A multiplicity of communication protocols are used for EDI data transmissions and will continue to be used throughout the 1990s. Convergence on the OSI model is the aim of most users and vendors. However, due to the large installed base of systems that use non-OSI protocols (particularly IBM's SNA protocol), a pure OSI network environment will probably not emerge in the 1990s.

- Work is underway to retrofit current EDI data format standards to work smoothly with X.400 protocols. X.400 use will increase in the 1990s, but non-X.400 transmissions of EDI will also continue.

- The need for real-time, transaction-processing-style EDI transmissions is growing and may impact data format design and the OSI store-and-forward model.

- No use of ISDN for EDI is known at this time. ISDN may play a role in real-time communication sessions between trading partners.

Value-added network service providers are seeing their competitive edge taken away by software.

- EDI-related information services are migrating away from third-party network providers to software maintained at the user's premises.
- Data format translation is done predominantly at users' sites.
- Large corporations are installing their own store-and-forward mailbox platforms, allowing many trading partners to communicate directly with the switch over standard (voice) telephone lines.

B

Competitive Environment

Primary vendors in the EDI market are software vendors, third-party software providers, and professional service firms.

With the exception of IBM and DEC, hardware vendors do not make their own software, and typically endorse and/or team with software vendors for packages that run on their platforms.

Successful service providers sell EDI software and systems integration services.

Service providers are seeking new value-added services such as data base services, electronic payment services (in association with banks), and international data communications (through interconnections and/or licensing of software with overseas network providers).

C

Recommendations to NTT

NTT is in a prime position to offer EDI services to Japanese and American trading partners and Japanese companies with subsidiaries in North America. It could take advantage of this position by offering services.

NTT could provide systems integration and trading partner locating/ implementation services for Japanese and American companies. NTT could become a business broker, introducing companies and helping them start trading electronically.

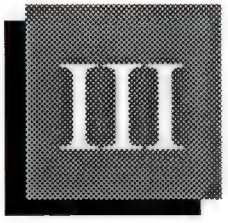
With its combined voice and data networks, NTT could position itself as a "one-stop" telecommunications provider to international firms doing business with Japan.

With its OSI architecture, NTT could provide full-featured store-and-forward services, allowing customers to send EDI, E-mail, facsimile, and image/graphics data through a single "pipeline." This would differentiate NTT from its competitors, which typically require customers to maintain separate accounts for each service.

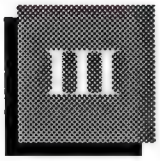
NTT could offer data base services (such as Japan-related news services) to its American network customers.

For NTT's data network to be viable in the United States, it must offer a wide variety of communication protocols and offer protocol conversion services.

A strong American service provider partner for NTT would be AT&T, because AT&T is the strongest proponent of the OSI architecture. Furthermore, since AT&T is looking for market share, it may be open to such an alliance.



EDI Market Conditions



EDI Market Conditions

A Background

Today, in the United States, virtually all large and many smaller companies have installed computerized systems for routine business operations such as order processing, inventory control, accounting, and so on.

A business will use these computer applications to prepare business documents such as purchase orders, invoices, shipment bills of lading, etc. Typically, the documents are printed out on paper and mailed to the appropriate trading partner of the company. For example, purchase orders are sent to suppliers, invoices to customers, bills of lading to transportation vendors, and payment instructions to the company's bank.

The company's trading partners receive these paper documents and, in most cases, input the data into their respective computer systems. In other words, the data generated in one company's computer system is temporarily transferred to paper so that the data can then be re-entered into another company's computer. A study by General Electric found that 70% of all data entered into computers is generated by other computers.

Electronic data interchange was invented to obviate the need for paper data transfer methods (and its associated high labor intensiveness and cost).

The rationale of EDI is to allow the direct application-to-application exchange of data representing business documents.

The exchange of data is sometimes handled by physically shipping computer tapes or diskettes. Increasingly, data networks are being used.

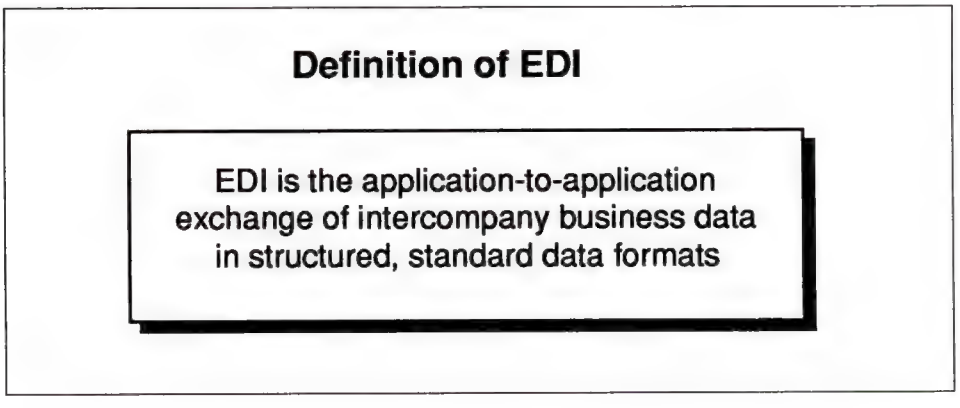
B

The Role of Standards

Rarely do two businesses have applications that format the data of their business documents identically. Furthermore, different computer systems (with different brands of hardware, software, telecommunication protocols, etc.) prevent applications from being connected and communicating with each other smoothly.

Thus, to allow computer systems to directly tie into each other, the data formats that represent the business documents must be standardized. Each organization is then free to build its particular applications to a common standard. The data is machine processable by any other application that has been built to the standard. Exhibit III-1 specifies the technical defnition of EDI.

EXHIBIT III-1


Definition of EDI
EDI is the application-to-application exchange of intercompany business data in structured, standard data formats

Despite the availability of public standards, however, there is much EDI that is conducted using proprietary data formats. Usually a dominant company requires its dependent suppliers to accept the data formats of its systems, with the penalty to the supplier being the potential loss of business if it doesn't comply.

C

Benefits of Using EDI

Companies using EDI benefit from improved use of labor, inventories, liquid capital (funds), and facilities.

Specific benefits of EDI can be found in:

Data Keying—EDI reduces or eliminates redundant data entry.

Errors—EDI eliminates keying errors; eliminates human interpretation/ classification errors; and eliminates filing errors and lost documents.

Filing—EDI replaces paper document filing with electronic files. It eliminates the need for human filing and file retrieval and reduces total space for computer files.

Paper Forms—EDI reduces paper forms, especially multipart carbons going to many departments.

Postage—EDI replaces mailed documents with data transmissions.

Invoicing—EDI eliminates the need to invoice, since payment can be automatically triggered upon receipt of goods (evaluated receipt settlement).

Payment—EDI replaces checks with electronic payment.

Accounts Receivable—EDI automates the cash application function, improves control, and eliminates the billing/invoicing function via evaluated receipt settlement.

Accounts Payable—EDI automates the entire payments process, including payment and remittance creation; it eliminates invoice validation via evaluated receipt settlement.

Inventory—EDI reduces order lead time and order confirmation delay; it facilitates just-in-time inventory and the maintenance of lower levels of costly inventory. It reduces out-of-stock situations and allows better control overall.

Customer Service—EDI allows for more responsiveness to customers and direct sales connections, and encourages lasting relationships with customers.

D

EDI and Other Data Communication Applications

For the purposes of market definition, analysis and discussion, EDI should not be confused with other closely related data communication applications.

On-Line Systems

On-line systems, such as computer reservation systems (CRSs) and customer order-entry systems, are not considered EDI. These systems adhere to a terminal-host architecture, not a host-host architecture which is mandatory for the application to be considered EDI.

Electronic Funds Transfer (EFT)

Buying and selling relationships involve inquiring, ordering, bidding, shipping, and similar activities. The process culminates with a monetary exchange.

EDI is typically associated with the transfer of information regarding the first set of functions, and EFT is the transfer of monetary value.

Financial institutions have developed structured, computer processable data formats by which they can transfer value among themselves and on behalf of their customers. As these formats were developed within the banking industry (and are under the control of the Federal Reserve), EFT is not considered wholly an EDI application.

In particular, data exchanges involved in automated teller machine, point-of-sale, and many kinds of interbank transfers (such as those for foreign exchange trades, cash concentrations or direct deposit of payroll) are considered outside the definition of EDI. Only those funds/data transfers that are specifically linked to a corporate-to-corporate business transaction are considered within the scope of EDI. Often, industry insiders call the funds transfer side of EDI, "EDI/EFT."

Electronic Mail

Electronic mail contains text that is freely formatted/structured and therefore not machine processable. Although allied to EDI, E-mail is not considered EDI and will not be analyzed in this report.

E

The Role of Value-Added Networks

Using today's standard (voice) telephone lines, the computer systems of a company can directly dial up another company's computers to exchange EDI messages. Many large companies, indeed, maintain their own substantial internal data communication networks and allow outside companies to dial into their networks. Some EDI today is done directly between companies using telephone lines in this manner. However, this is not practical for the majority of companies that are using or could potentially use EDI.

- The computers, communication protocols to connect them, and the data formats between sending and receiving computers may be incompatible.

- Business relationships are numerous and complex, especially for large companies. Each EDI trading partner may have unique data formatting, protocol, scheduling, and other requirements. Managing the multitude of specific requirements quickly becomes a significant task (requiring people and computing resources) when many (twenty or more) EDI trading partners come on-line.

- Direct links require expensive hardware of the host company. Multiple telecommunication ports, 24-hour continuous operation capability, fault-tolerant architecture, network management capabilities, mailboxing capabilities, the ability to handle a variety of protocols and line speeds, and security features are mandatory.

Because of these difficulties, the need arises for a third party, such as a value-added network (VAN) or a remote computer service bureau (RCS), to act as an intermediary between companies that trade electronically.

In addition to resolving the above-mentioned shortcomings of direct telecommunications between companies, third-party VANs provide other services to EDI-using companies. Exhibit III-2 lists the benefits of using a third-party VAN or RCS.

EXHIBIT III-2

Benefits of a Third-Party VAN/RCS

- Store-and-forward mailboxing, to accommodate differing schedules of trading companies
- System integration/connectivity, to allow different computer systems to communicate with each other
- Aid in bringing up new EDI trading partners
- Reliability and large resources
- Security
- Tracking and control reporting
- Network management
- Easy access to many companies to trade with
- Data format conversion and translation

Today, networking for EDI transmissions is provided in three general variations:

- Directly between two companies using standard telephone lines.
- Via a third-party VAN/RCS, store-and-forward switch.

- Via an industry association clearinghouse, which is similar to a VAN/ RCS. Transnet (automotive parts), IVANS (insurance), and Specification 2000 (aircraft parts and services) are examples of this approach.

F

The Role of Software

Essential to EDI is the translation of company data formats into standard formats or into the proprietary formats of a leading trading partner.

Users subscribing to VAN or RCS services may rely on software hosted on the vendor's processors to perform data format translations.

Alternatively, users may conduct this translation function on their own premises using in-house translation software. This approach is less expensive over time and is the dominant trend.

Users can write their own EDI translation software or purchase it.

- If purchased, customization and interfacing to internal applications by the software vendor, a professional service vendor, a consultant, or the user's own development staff is usually required.

- EDI software should be closely linked ("mapped") to existing applications to optimize its usefulness. Otherwise, a company may print out received EDI transactions and rekey the data, losing efficiency.

G

Leading Industries Using EDI

Industries most actively using EDI are:

- Transportation (primarily railroads, deep sea shipping, and trucking companies; to a lesser extent, couriers and air transport)

- International trade services (customs brokering, freight forwarding, port authorities, U.S. Customs)

- Discrete manufacturing (particularly automobile, textile, and apparel manufacturing)

- Retail and wholesale distribution (mostly in general merchandise goods, pharmaceuticals and hardlines)

- Grocery (particularly between food manufacturer and wholesaler/ distributor)

- Process manufacturing (particularly the oil industry and some sophisticated but dispersed implementations in chemicals)

Special cases of EDI—where data formats are highly specialized for particular interorganizational processing functions, and specialized niche vendors provide VAN/RCS services—are occurring in the following industries:

- Banking and finance. This is primarily for bank-to-bank and client-to-bank funds transfers, such as cash concentrations, direct deposit of payroll, and lockbox services. Corporate-to-corporate electronic payments are still sparsely conducted. Only the big three automobile manufacturers are paying suppliers electronically on a large scale.

- Electronic medical claims submissions. Health care providers telecommunicate insurance claims to insurance companies for payment of services rendered. A consortium of insurance companies called National Electronic Information Corporation and other independent vendors provide processing services for this niche market.

- Property and casualty insurance claims. EDI in the insurance industry is called interface. The most widely used network is the Insurance Value-Added Network Service (IVANS) over IBM's Information Network and recently, on the Sears Communications Network. Business data, representing requests for price quotes, claims, etc. is translated into standard electronic formats and communicated between business partners (insurance agents and the underwriting companies). Several insurance companies have their own captive systems.

- Educational institutions. Data is transmitted between universities and government agencies and among universities in proprietary, system-specific formats (usually on magnetic tapes). The information exchanged is student transcripts, test scores, government loan information, and veteran status information.

H

User Trends in Adopting EDI

1. Reasons for Implementing

Typically, it is the large Fortune 1000 companies that consider EDI a strategic technology and deliberately incorporate it into long-range plans. Smaller companies do not view EDI as strategic, and frequently implement it only because their largest customer has requested them to do so. In a recent INPUT survey, 63% of the companies said that they implemented EDI because their most important customer requested it. Only 33% said they implemented EDI for its strategic advantages.

2. The "Hub and Spoke" Phenomenon

Because of implementation circumstances in which most users adopt EDI because a large trading partner has requested it, a "hub-and-spoke" pattern has emerged. A single large company—the hub—has electronic

ties with several suppliers and trading partners—the spokes. EDI very typically grows along the lines of these hub-and-spoke clusters.

3. Customer Premise Data Format Translation

Since the mid-1980s, users have increasingly opted to perform data format translation on their own hardware platforms with purchased or developed software and not use the translation function of the VANs. An explosive increase in the number of third-party software vendors (there are now more than 40) since 1985 has led to a large selection of translation software. Packages are available not only for mainframes, but micros and midrange computers as well. Prices range from $600 to $20,000 for these non-mainframe packages and $15,000 to $45,000 for mainframe packages. Thus, there are multiple points of entry for the novice EDI company.

4. User Platforms

In the hub-and-spoke situation, the large hub company usually implements a mainframe translation software package. Its trading partner "spoke" companies usually implement micro or midrange packages. Sometimes, however, a large company will use a smaller platform than a mainframe—often a micro—to perform all communications with the VAN and all data format translation. The smaller platform is connected to the company's mainframe(s) where the applications reside. Such a configuration also provides a level of security by keeping outside telecommunications from directly interacting with the company's central processor.

5. Use of Networks

Method—INPUT's research shows that the majority (64%) of EDI users are using third-party networks. Very few (8%) telecommunicate directly with trading partners (using ordinary telephone lines). However, nearly 30% use both direct and third-party services and this "combination" group is expected to expand in proportion to the others.

Dual sourcing—INPUT's research shows that 25% of the surveyed sample uses more than one third-party network. Multiple networks are used to reach the greatest number of trading partners.

Internetworking services—The main EDI networks today are interconnected and will hand off a customer's EDI messages to other networks for delivery. Nearly 60% of EDI users are using this service.

6. International Usage

International transmissions of EDI messages are happening only in scattered implementations of typically multinational companies. A handful of large multinational companies, particularly auto makers, chemical companies (Du Pont, Dow, Ciby-Geigy) and electronics companies (Texas Instruments, Intel, Motorola, Hewlett-Packard) are conducting EDI with trading partners abroad. Often these uses of EDI are for communications with subsidiaries (distributors or facilities owned by the multinational).

A lack of international data format standards is partly responsible for the sparse international EDI activity. The international standard, EDIFACT, has yet to mature (only two message formats are ready for production use). Companies are reluctant to set up operations using the North American standard, ANSI X12.

A strong force in the development of international EDI is the international transportation industry, particularly shipping lines, government customs authorities, and industry service providers such as customs brokers and freight forwarders. The major ports of the industrialized world have EDI projects.

An experimental EDI network to connect Korean suppliers to the North American retail market has been underway for approximately one year. Sears Communication Company has partnered with the Korean state-run VAN, DACOM, to provide network services. ANSI X12 standards are being used.

International EDI is at this time negligible. However, users—especially large multinational corporations—are planning to employ it for global operations and trade. Network service providers are responding to this growing demand and are building global networking capacity (see Technical Trends, Network Services).

7. EDI and EFT

Corporate-to-corporate electronic payment for goods and services is still in its infancy. INPUT estimates that users spent $5 million in 1989 for EDI/EFT payment services. Most companies surveyed in this report indicated that they do not use electronic payment. Only two—trucking company Yellow Freight and auto parts manufacturer Gates Rubber—are paying or being paid electronically. Both companies are engaged in electronic payments with only their largest customers, not all trading partners. This insignificant usage of EDI/EFT is representative of the U.S. market for payment services.

Even the two insurance companies interviewed in this study, Aetna and Lincoln National, are not using EDI/EFT to pay claimants. Large-scale EDI users such as Mervyn's and American President Companies, who have hundreds of EDI trading partners, are not using electronic payment at all.

Electronic payment services are more complicated than other EDI messaging services. Besides the two transacting businesses and a third-party network, payment services also involve two more parties in the exchange—the banks of the businesses. Electronic messages must be delivered to more parties than in a nonfinancial EDI exchange. Designing the services and data standards to support the interconnection of these numerous parties has partly delayed the adoption of EDI/EFT. Another factor has been conservatism on the part of corporations. Corporate accounts payable managers see EDI/EFT as the elimination of payment float.

Nevertheless, EDI/EFT is beginning to attract more attention from corporations. Numerous service vendors have allied with banks to offer services. (This is explained in more detail under Technical Trends.) INPUT estimates that user expenditures for EDI/EFT network services will grow 76% per year, from $5 million in 1989 to $88 million in 1994.

Since the 1970s, U.S. banks have built their own electronic network to enact electronic funds transfers (EFT) among themselves. This network is called the Automated Clearinghouse (ACH) and it is supported by the Federal Reserve. Banks have developed data formats that support funds transfers between institutions.

The ACH would have to be upgraded if banks were to offer transport services for all EDI messages. The Federal Reserve is opposed to such action. Furthermore, only a few (50 or 60) banks are interested in providing EDI payment services to their customers.

Thus, the banking industry is offering EDI only as it concerns funds transfers, and only in conjunction with existing EDI service providers.

Banks are not planning to become outright EDI service providers even though they have a network at their disposal.

8. Relationships with Trading Partners

EDI is often implemented along with just-in-time (manufacturing) or quick-response (retail) inventory programs. JIT and QR are inventory management concepts designed to minimize inventory levels. Only enough vendor products are ordered to meet the demands of production or customer sales.

In addition to minimizing on-hand inventories, JIT and QR programs often minimize the total number of suppliers a company does business with. Companies seek only those suppliers who competently meet delivery dates and quality levels. Thus, EDI is often conducted among companies that have formed a very close business relationship.

9. EDI Use Grows in Two Dimensions

Typically, a pilot EDI program starts with a single transaction set (for example, a purchase order), with a single trading partner. After the pilot—which may take anywhere from one week to three months—more trading partners are brought in using the same transaction set. Once a certain volume of trade is conducted in a single transaction set, a new transaction set is introduced and the process is repeated. First the number of trading partners increases, then the number of transaction sets.

10. Parallel Paper and Electronic Systems

No company yet transacts all business in EDI (automobile manufacturers may be the first companies to do so). Even advanced EDI-using companies use EDI in small proportions of its potential use. Typically, a company only sends EDI purchase orders to a handful of key suppliers. INPUT's survey of large Fortune 500 corporations (corporations with billions in revenues) found that the average number of EDI relationships was only 110—despite these large companies having thousands of trading partners.

EDI-using companies have discovered an "80-20" rule in implementing EDI. The top 20% of their trading partners are responsible for 80% of their business. Therefore, a company will target these key partners to start an EDI program. For the remaining 80% of their trading partners (with whom the company transacts only 20% of its business), traditional paper documents are used. Thus, all companies conducting EDI today have two parallel systems: EDI and paper.

I Common Implementation Procedures

The following steps have been recommended by companies that have successfully implemented EDI programs.

1. Nominate a "project champion" who can represent the case for EDI at high levels.

2. Create an internal project team with a senior project manager and department representatives from accounting, purchasing, sales and marketing, manufacturing, distribution and other involved departments.

3. Analyze internal and external information flow. Identify information that is flowing, who interacts with it, what the time priorities are, and how the data is gathered, stored, processed and transmitted (by hand or machine).

4. Identify key trading partners based on volume of trade, profit contribution, market share, production impact, and/or cost.

5. Analyze the costs involved (the start-up and ongoing costs of hardware, software, telecommunications, and consulting).

6. Agree with targetted trading partners on the ground rules for electronic trading—including standards and networks to be used, transmission times, start dates and implementation timetable.

7. Make legal contracts with trading partners and with VANs.

8. Train staff and prepare documentation for computer staff, users, and consultants.

9. Implement. Each stage of testing and implementation requires the cooperation of trading partners and VANs. Clarify goals and responsibilities at each stage of testing. Run a pilot program. Run the newly implemented EDI program in parallel with the old method.

10. Provide post-implementation support. Ensure satisfaction of trading partners. Establish relations with user groups in the industry and with individual VANs.

J

Forces Driving the EDI Market

The following factors are contributing to the growth of the EDI market:

- Users adopt EDI because it addresses fundamental business functions such as lower costs in clerical labor and inventories, improved management and productivity, etc.
- In many instances, large companies are requiring their trading partners to adopt EDI as a condition of continued business.
- EDI implementation has a decreasing marginal cost for adding new EDI partners and transaction sets. Investment in an EDI program exhibits an increasing return to scale.

K

Forces Inhibiting the EDI Market

There are several factors preventing rapid growth of the EDI market:

- The "early telephone" effect—Relatively few corporations are EDI-ready. There is little incentive to implement when nobody else has.
- Systems integration difficulties—Integrating EDI with internal systems, such as order entry, accounting, inventory and shipping, is a major stumbling block. Approximately 50% of the companies practicing EDI today are moving EDI messages electronically in and out of applications. The other 50% print out data on paper and manually rekey the data into an application.
- Standards confusion—Concern over the new international standard, EDIFACT, and how it will work with X12 makes users hesitant to adopt EDI.
- Limited but growing user awareness—EDI is a simple concept but has many details in implementation (standards, network services, integration, arrangements with trading partners).
- Difficul to cost-justify—Although EDI, as part of a larger program of JIT, total quality control/customer satisfaction has been shown to reduce costs and/or to enhance customer service, its specific financial impact is not easily determined. Especially in smaller companies, implementing EDI is merely a cost of doing business.

L

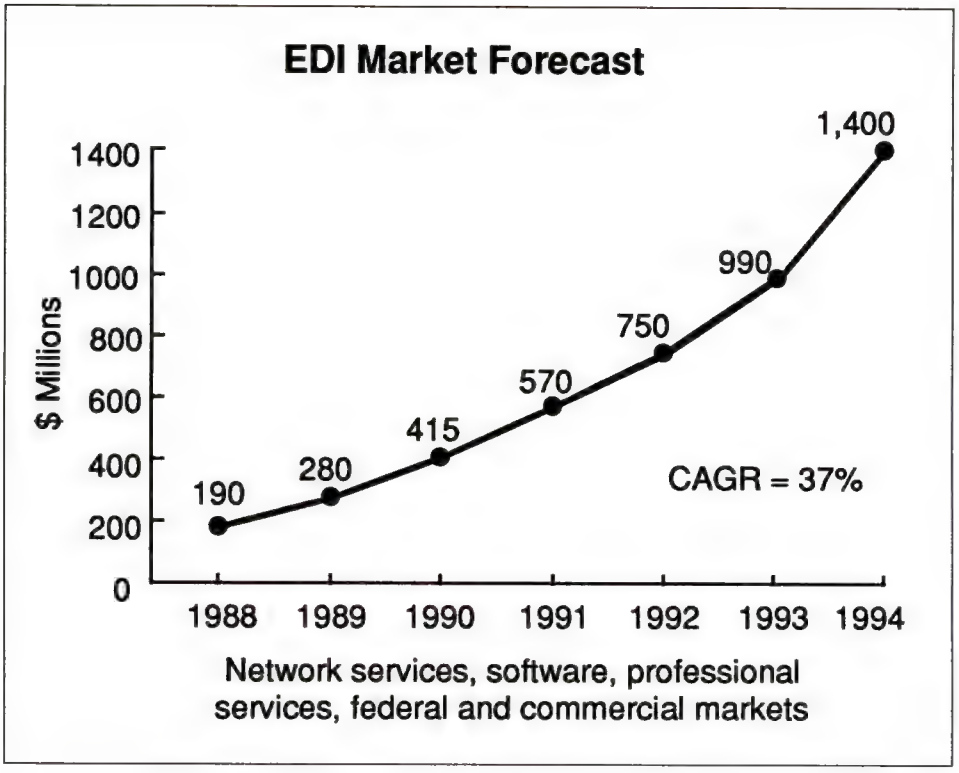
Competitive Environment

Approximately 10,000 companies in North America use EDI today. INPUT estimates that user expenditures for EDI software products, network and professional services in the public and private sectors totalled $280 million in 1989. This represents a 47% growth over the 1988 total of $190 million.

INPUT's growth projections anticipate a 37% compound annual growth rate from 1989 through 1994, providing a $1.4 billion market in that year, as shown in Exhibit III-3.

INPUT estimates that user expenditures on network services for EDI alone will reach $860 million in 1994.

EXHIBIT III-3



The leading network service providers and their market share are shown in Exhibit III-4.

EXHIBIT III-4

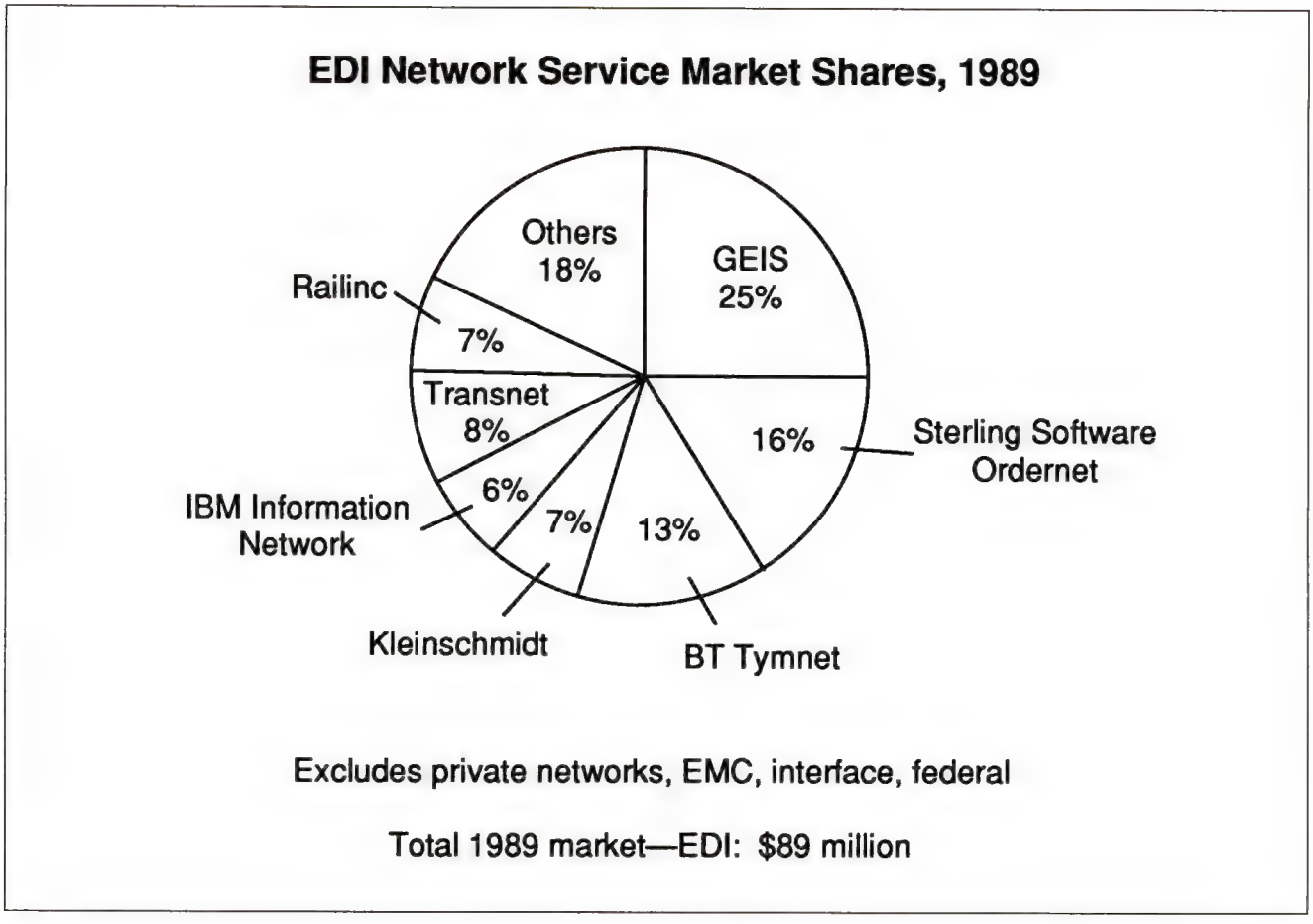
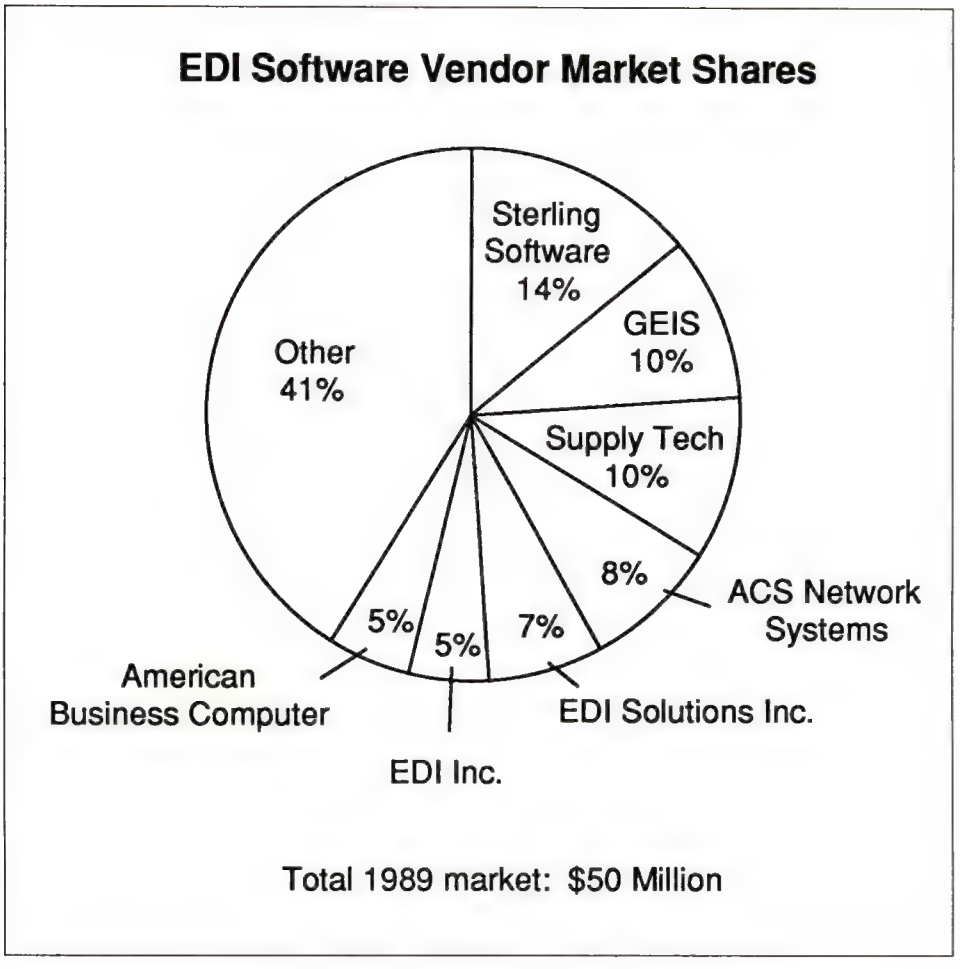


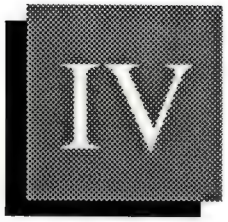
Exhibit III-5 shows the leading software vendors and their market share.

EXHIBIT III-5

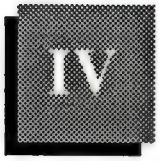


Professional services (consulting, systems integration, training, and support) for EDI is a more amorphous market than professional services for software and network services. Vendors to this market segment come from various categories: large professional accounting firms, small independent consultants, service and software providers, in-house corporate MIS personnel. Because of this heterogeneity of suppliers, market share figures are impossible to find.

However, leading consulting companies in EDI are: Price-Waterhouse, Ernst and Young, Deloitte-Touche, IBM, General Electric Information Services and Digital Equipment Corporation.



Technical Trends



Technical Trends

This chapter examines the trends in standards development/evolution and in product and service offerings in the EDI market.

A
Standards

1. Background

EDI requires data representing business documents (such as purchase orders, invoices, etc.) to be formatted in structured, electronic, machine-readable files.

For businesses to send these files from one company's computer to another's, the businesses involved must agree beforehand on the design of the format. Otherwise, the computers couldn't communicate.

Today, EDI is conducted using formats that are proprietary (decided upon by a single company and its many trading partners, such as Sears and its SENDEN format), industry-specific (decided by a single industry, such as the grocery industry's UCS), or public standard (decided by multiple industries in consensus, such as ANSI X12 and EDIFACT).

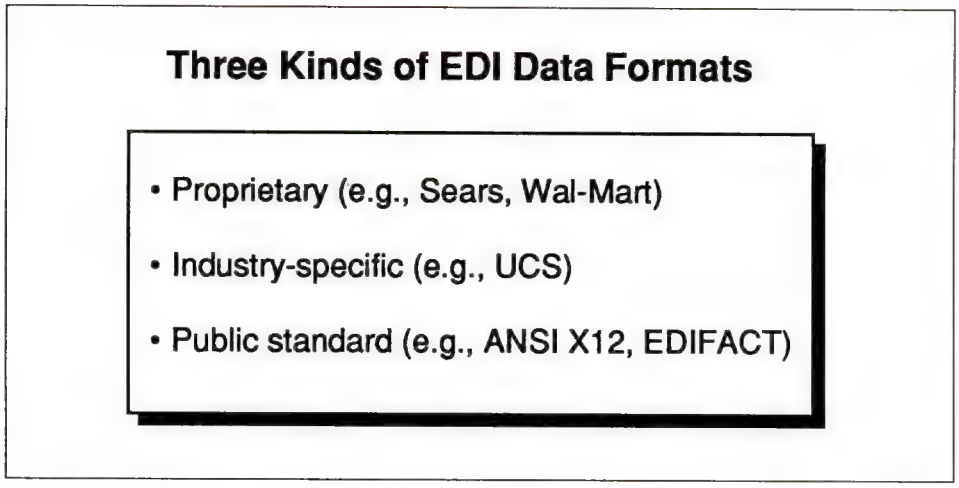
Exhibit IV-1 lists the three kinds of EDI formats.

The EDI community loosely refers to all data formats as "standards," even though in the case of proprietary formats, the term is a misnomer.

There are several primary EDI standards:

- ANSI X12—the Accredited Standards Committee (ASC) of the American National Standards Institute's X12 organization develops general business document standards. The ASC X12 is managed by the Data Interchange Standards Association (DISA), which is the industry body representing U.S. interests in the devlopment of EDIFACT, the evolving international EDI standard.

EXHIBIT IV-1


Three Kinds of EDI Data Formats
• Proprietary (e.g., Sears, Wal-Mart)
• Industry-specific (e.g., UCS)
• Public standard (e.g., ANSI X12, EDIFACT)

- UN/EDIFACT—In 1988, the United Nations chartered a group to develop an international EDI standard. The organizational structure for Electronic Data Interchange For Administration, Commerce, and Trade has finally stabilized and two standards (one for invoices) are completed and in production-ready form. EDIFACT is to be developed by representatives from national EDI standards groups.

- TDCC/WINS—TDCC (Transportation Data Coordinating Council), now called the EDI Association (EDIA), was the original EDI standards body that created standards for freight documents and then for warehousing (WINS). TDCC/EDIA has turned over the development authority of its standards to the ANSI X12 ASC. TDCC/EDIA is now occupied with publishing implementation guidelines and serving user needs.

- UCS—The Uniform Code Council developed the Uniform Communication Standard (UCS) for the grocery industry. The standard is used for EDI between food products manufacturers and grocery distributors.

In addition to standards created for cross-industry use, there are several standards intended for more limited use.

- Several industry-focused groups have developed ANSI X12 implementation guidelines which specify how the generic X12 standards shall be used in the given industry. Groups exist in the agricultural, apparel (VICS, TALC), chemical (CIDX), electrical supply, electronics (EIDX), health care, metals, office products, petroleum (Petrodex), telecommunications equipment, and utilities industries.

- ANSI X12 variants have also been developed for the automotive, petroleum, and printing industries. These variants are either being merged into ANSI X12 or frozen, and future transaction sets developed will use ANSI X12.

- Many industry groups have developed their own systems and standards for EDI. Among these are the air transport, automotive aftermarket, book selling, hardware, health, insurance, iron and steel, petroleum, warehousing, and wholesale drug industries.

- Specific companies have developed proprietary systems for competitive and efficiency reasons. These systems are being supplanted by ANSI X12-based systems. Among these companies are the automotive "Big Three" (Chrysler, Ford, and General Motors), Baxter-Travenol, K-Mart, McKesson, and Sears.

- Many proprietary systems were developed before public standards existed, such as systems for the federal government (Census Bureau trade statistics) and educational institutions. Such organizations are either freezing their proprietary systems or abandoning them altogether.

Exhibits IV-2, IV-3, and IV-4 show the typical structure, terminology, and comparison with paper documents of X12 EDI formats.

EXHIBIT IV-2

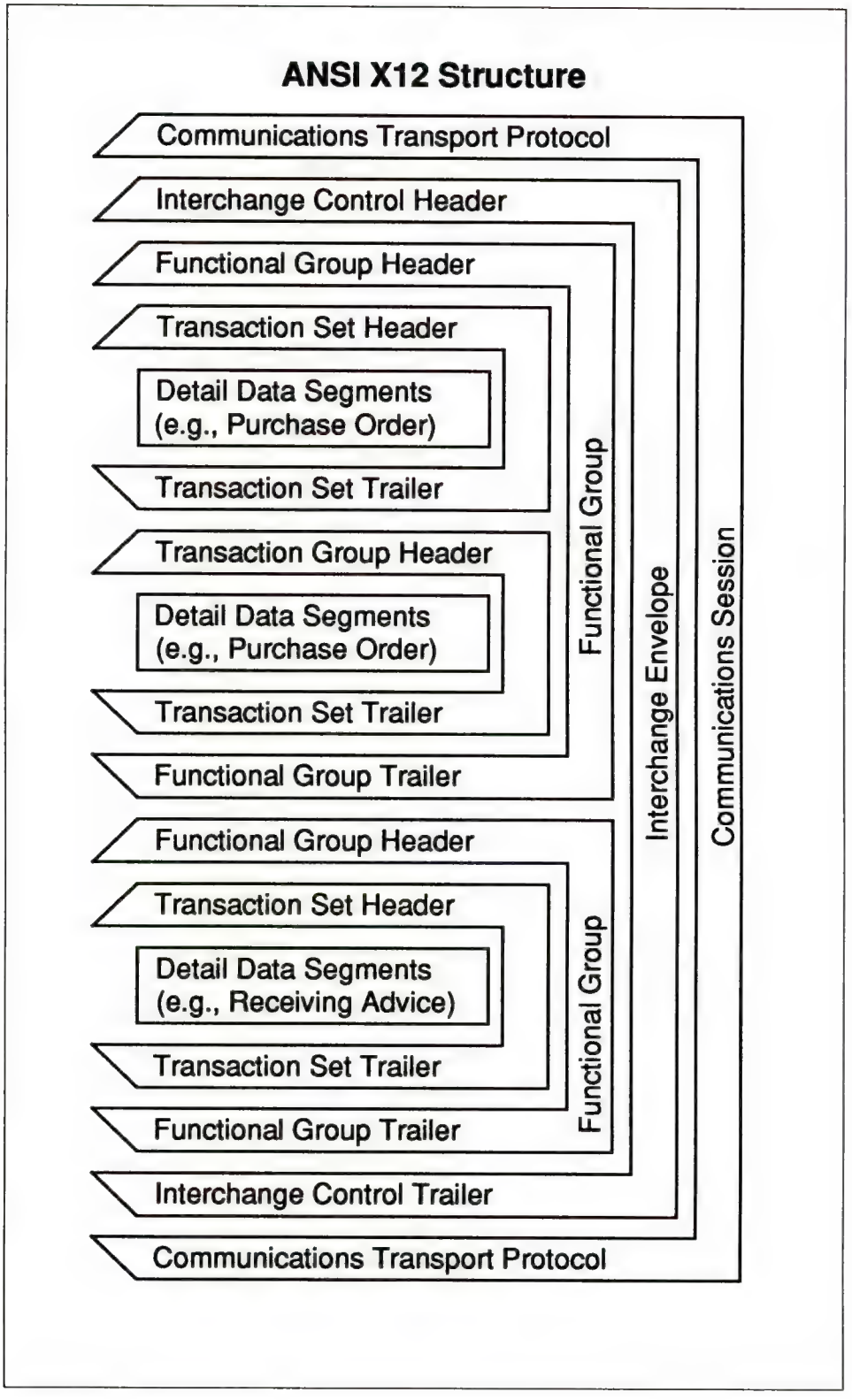

ANSI X12 Structure
Communications Transport Protocol
Interchange Control Header
Functional Group Header
Transaction Set Header
Detail Data Segments (e.g., Purchase Order)
Transaction Set Trailer
Transaction Group Header
Detail Data Segments (e.g., Purchase Order)
Transaction Set Trailer
Functional Group Trailer
Functional Group Header
Transaction Set Header
Detail Data Segments (e.g., Receiving Advice)
Transaction Set Trailer
Functional Group Trailer
Interchange Control Trailer
Communications Transport Protocol
Functional Group
Functional Group
Interchange Envelope
Communications Session

EXHIBIT IV-3

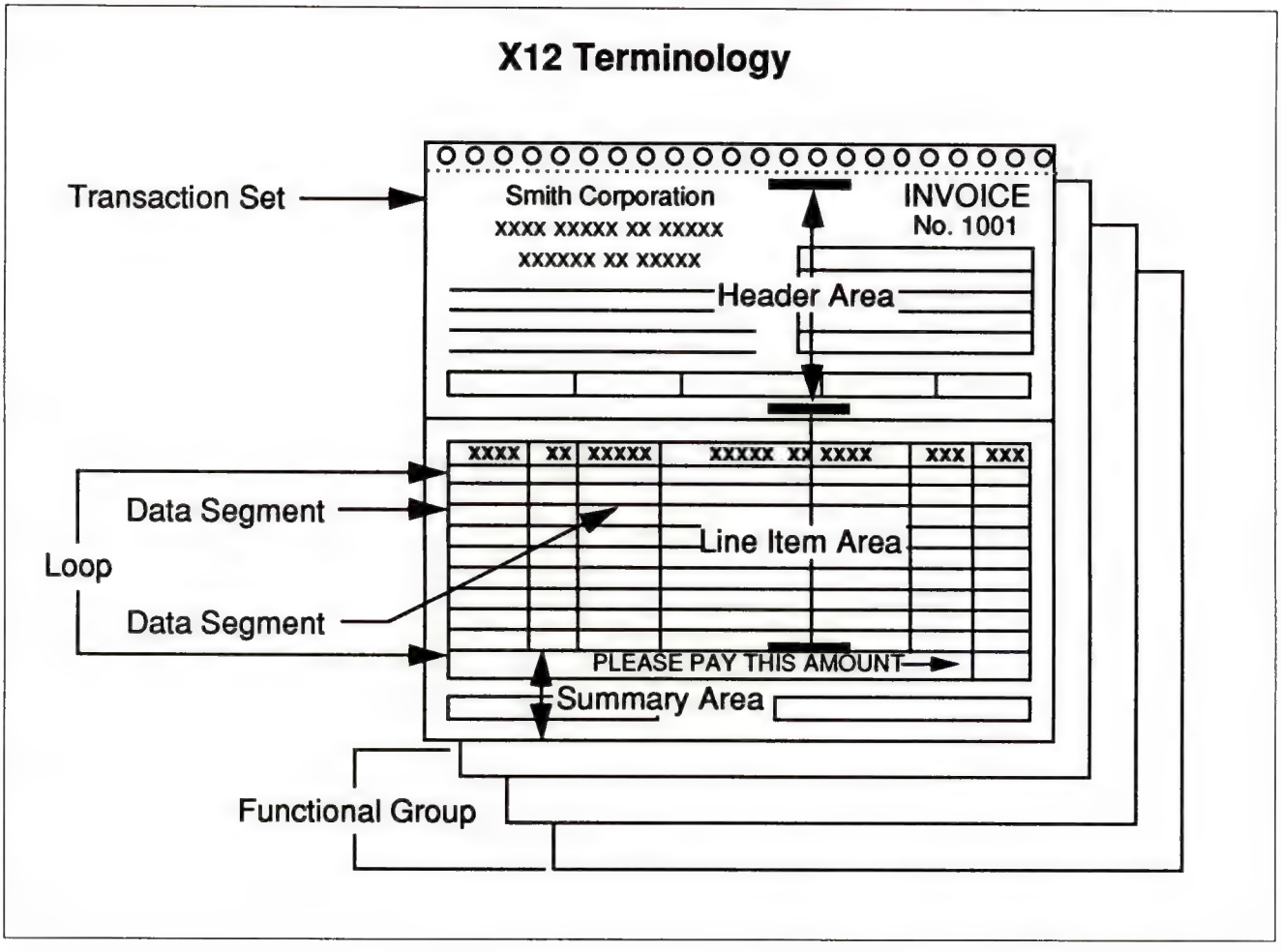

X12 Terminology
Transaction Set
Smith Corporation
xxxx xxxxx xx xxxxx
xxxxxx xx xxxxx
INVOICE
No. 1001
Header Area
xxxx xx xxxxx xxxxx xx xxxx xxx xxx
Data Segment
Loop
Data Segment
Line Item Area
PLEASE PAY THIS AMOUNT
Summary Area
Functional Group

EXHIBIT IV-4

EDI Format Versus Paper Format (Invoice)

ST*810*0001 N/L	TRANSACTION SET HEADER				
BIG*810713*1001*810625*P989320 N/L	Date 7/13/81 Order Date 6/25/81			Invoice No. - 1001 Cust. Order No. - P989320	
LS*100 N/L	LOOP HEADER				
N1*BT*ACME DISTRIBUTING COMPANY N/L N3* P.O. BOX 33327 N/L N4* ANYTOWN*NJ*44509 N/L	CHARGE TO ACME Distributing Company P.O. Box 33327 Anytown, NJ 44509				
N1*ST*THE CORNER STORE N/L N3* ^)! FIRST STREET N/L N4*CROSSROADS*MI*48106 N/L	SHIP TO The Corner Store 601 First Street Crossroads, MI 48106				
N1*SE*SMITH*CORPORATION N/L N3*900 EASY STREET N/L 48BIG CITY*NJ*15455 N/L	REMIT TO Smith Corporation 900 Easy Street Big City, NJ 15455				
LE*100 N/L	LOOP TRAILER				
IT9*01*03*2**10 N/L	TERMS OF SALE. . . 2% 10 days				
PER*DU*C.D. JONES*TE618/555-8230 N/L	CORRESPONDENCE TO C.D. Jones 618/555-8230				
LS*200 N/L	LOOP HEADER				
	QUANTITY	UNIT	NO.	DESCRIPTION	PRICE
IT1*3*CA*127500*VC*6900 N/L	3	Cse	6900	Cellulose Sponges	12.75
IT1*12*EA*4750*VC*P450 N/L	12	Ea	P450	Plastic Pails	4.75
IT1*4*EA*9400*VC*1640Y N/L	4	Ea	1640Y	Yellow Dish Drainer	.94
IT1*1*DZ*34000*VC*1507 N/L	1	Dz	1507	6" Plastic Flower Pots	3.40
LE*200 N/L	LOOP TRAILER				
CAD*N****CONSOLIDATED N/L	Via Consolidated Truck				
TDS*5111 N/L	INVOICE TOTAL PLEASE PAY THIS AMOUNT $51.11				
SE*24 N/L	TRANSACTION SET TRAILER				

2. Summary of Trends

Exhibit IV-5 summarizes the trends that are occurring in EDI standards.

EXHIBIT IV-5

Trends in EDI Standards

1. Industry-specific and proprietary data formats are being migrated/converted into ANSI X12 standards.
2. The ANSI X12 standards family (including standards being migrated into it) is being reconciled with the international EDI standard, EDIFACT.
3. ANSI X12 standards are being retrodesigned to comply with the X.400 messaging standard.
4. New standards will be developed in the ANSI X12 and EDIFACT committees, and existing X12 standards will continue to evolve.
5. Special EDI data format and communication protocol standards may be developed to permit real-time, on-line processing of EDI messages.

a. Migration to ANSI X12

TDCC, WINS, and UCS standards organizations are in the process of transferring development and maintenance authority to the ANSI X12 committee. These transferred standards are being reviewed by the Industry Standards Transition subcommittee of X12 and will be given an X12 number (see Exhibit IV-6).

b. X12 and EDIFACT

The North American EDIFACT Board (NAEB) is responsible for communicating North American user needs to the UN/EDIFACT standards development body. The NAEB is part of the X12 organization, as shown in Exhibit IV-6. Also, it is the X12 organization that is North America's

voting constituency on draft standards proposed by UN/EDIFACT. A special ad hoc committee in X12 is forming to study how X12 and EDIFACT standards can be merged. UN/EDIFACT is a young standards family with, at this writing, only two working standards in use. Some expect that those working on EDIFACT standards will model future development along the lines of existing X12 standards. Nevertheless, INPUT believes that both the ANSI X12 and the UN/EDIFACT standards will develop in parallel for the next five years. Companies and industry groups will choose between them based on their business needs, the requirements of their trading partners, the basic nature of their commerce, and the availability of suitable transaction sets. X12 standards will undoubtedly be used in the U.S. (and other parts of the world) where trade is entirely confined within a single country. UN/EDIFACT will be used mostly in international trade relationships.

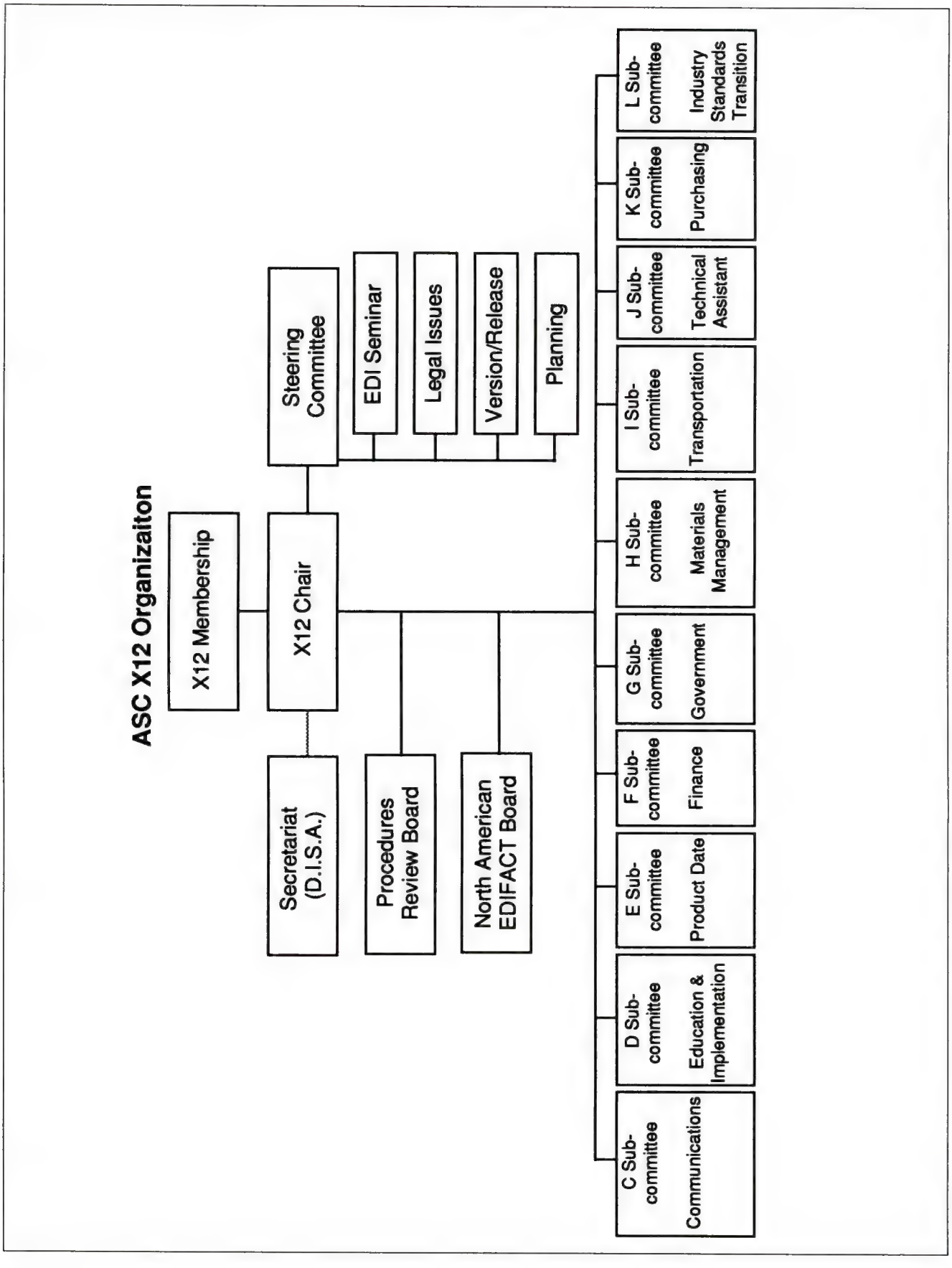
c. X12 and X.400

Only one large EDI installation uses X.400 to send EDI messages (Texas Instruments; MCI is the network provider). AT&T is offering X.400 protocols for EDI but no production systems are currently in operation. CCITT work is now underway to define the protocol for an EDI body type, informally referred to as P-EDI. Approval is possible as early as late 1990, under the CCITT's accelerated approval procedures. Interfusion of X.400 and EDI will follow this path, with EDI documents being defined as one or more body types within an X.400 envelope. Current ANSI X12 work on extended communications envelopes (ISB, ISC, etc.) can be viewed as a necessary interim measure until the P-EDI protocol is fully developed.

d. Real-Time EDI Standards

Representatives from the Automobile Industry Action Group (AIAG, the auto industry's trade group), are petitioning X12 to form a committee on real-time EDI that would develop real-time EDI data formats. Also, the CCITT Transaction Processing committee is working on real-time amendments to the OSI model. Real-time EDI is the interaction of two software applications at the time of data exchange. Such a design radically differs from the OSI model, which is essentially store-and-forward and does not support real-time processing well. Real-time requires the processing of a transaction set, or segments within a transaction set, one at a time. Normal EDI processing has many transaction sets processed in a batch mode. Users in the automobile industry and other manufacturing industries with just-in-time relationships with suppliers are implementing real-time EDI. For example, a buyer company checks EDI advanced ship notices from a supplier against manufacturing resource requirements, purchase orders, and data element compliance. Any errors are rejected and the shipment is kept from being delivered, insuring smooth operation

EXHIBIT IV-6


ASC X12 Organizaiton
X12 Membership
X12 Chair
Steering Committee
EDI Seminar
Legal Issues
Version/Release
Planning
Secretariat (D.I.S.A.)
Procedures Review Board
North American EDIFACT Board
C Sub-committee Communications
D Sub-committee Education & Implementation
E Sub-committee Product Date
F Sub-committee Finance
G Sub-committee Government
H Sub-committee Materials Management
I Sub-committee Transportation
J Sub-committee Technical Assistant
K Sub-committee Purchasing
L Sub-committee Industry Standards Transition

of JIT deliveries. Also, reservation systems in Europe (particularly for ferry services) are implementing real-time EDI systems. Note: today's computer reservation systems are not considered real-time EDI because they are a single application (not two) operating under a host-terminal architecture. How real-time EDI will impact the OSI architecture is not known at this time. How it will be incorporated into an ISDN setting is also unknown. There are no known uses of ISDN lines for the transport of EDI messages.

3. Communication Protocol Standards

Adding diversity to the standards landscape of EDI are the many communication protocols that are used to send EDI messages.

According to the OSI model, EDI is an application (found at the highest, seventh, layer of the model). Communication protocol functions, according to the model, are to be handled by lower-level functions of the model. Communication functions are not to be specified in EDI designs.

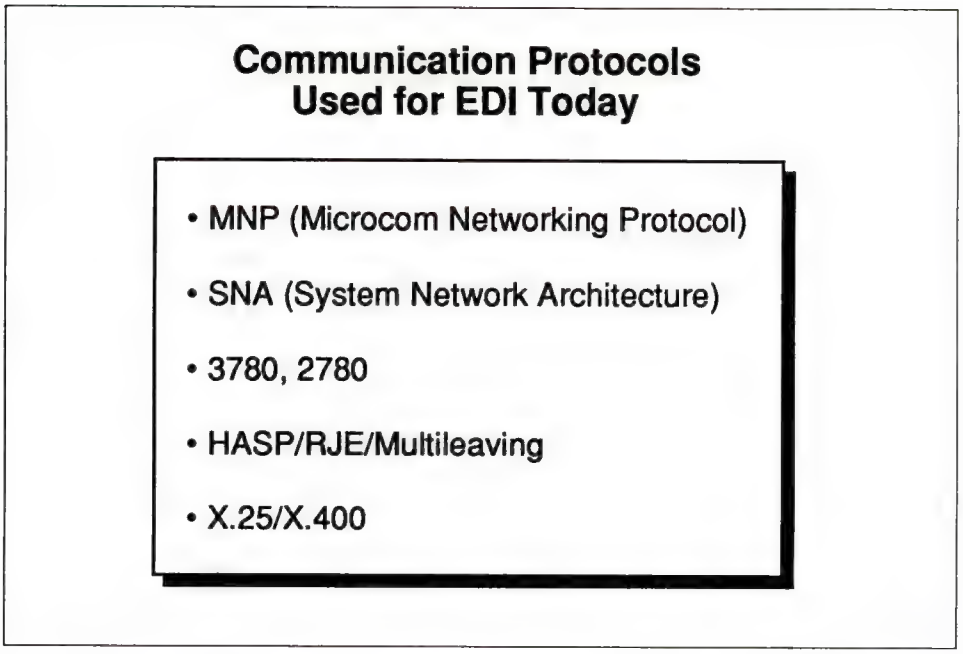
However, companies began using EDI before the OSI model had fully matured. Many EDI data formats, therefore, specify communication protocols/functions. The UCS data format, for example, specifies communication functions on layers two through six of the model. Even ANSI X12, the EDI standard most closely adhering to the OSI model, has address headers built into it—a function that would be taken care of by the X.400 standard of the presentation layer (sixth layer).

Furthermore, today's data networks (public and private) have evolved from proprietary designs. Although some parts of them adhere to the OSI model, other parts do not. Consequently, user access to networks typically involves using a non-OSI protocol (such as 3780, HASP, SNA, or MNP). Most public data networks use X.25 packet switching for internal routing of messages. Yet, when the messages exit the commercial network and are passed over to a customer platform or to another network or remote processing service, another non-OSI protocol is typically used.

For example, in using Sterling Software's Ordernet EDI services, a customer might first connect to the Telenet network in a dial-up, asynchronous mode. Telenet, in turn, would wrap the data in an X.25 protocol and send it to Ordernet. Ordernet would unwrap the X.25. When the receiving company accessed its mailbox to download the data from Ordernet, it would use the 3780 protocol.

Exhibit IV-7 lists today's most common communication protocols used by EDI users.

EXHIBIT IV-7



- MNP (Microcom Networking Protocol) is primarily used by microcomputer installations. MNP is similar to SDLC (synchronous data link communication), but in an asynchronous mode. Small 'mom and pop' (spoke) companies use it.

- SNA, IBM's System Network Architecture, is increasingly becoming the choice of large companies, such as American President Lines (shipping), Levi Strauss & Co. (apparel manufacturer), Meyers (retail), Kroger (grocery distributor), and Mennan (manufacturer). It also runs, however, on PCs. SNA came out in 1984 and has been used until now primarily for on-line communications (between a terminal and a host). Now users are discovering that it is a great file transfer method. It is IBM's equivalent of SDLC.

- 3780, 2780—These numbers originally referred to IBM terminal equipment attached to a host. The Uniform Code Council (UCC) sanctioned this protocol as a standard in the late 1970s. Vendors of telecom software and hardware have subsequently built it into their products as one of the protocol options. Since it is relatively unsophisticated, it became the "common denominator" protocol most often used. Consequently, it has become the de facto communications standard. Every computer can emulate it. According to a VAN communications manager, it is firmly entrenched and people don't want to change. It will never die. The UCC, however, is now recommending that users migrate to X.25.

- HASP/RJE/Multileaving—This protocol is almost as sophisticated as SNA, and more sophisticated than 3780.

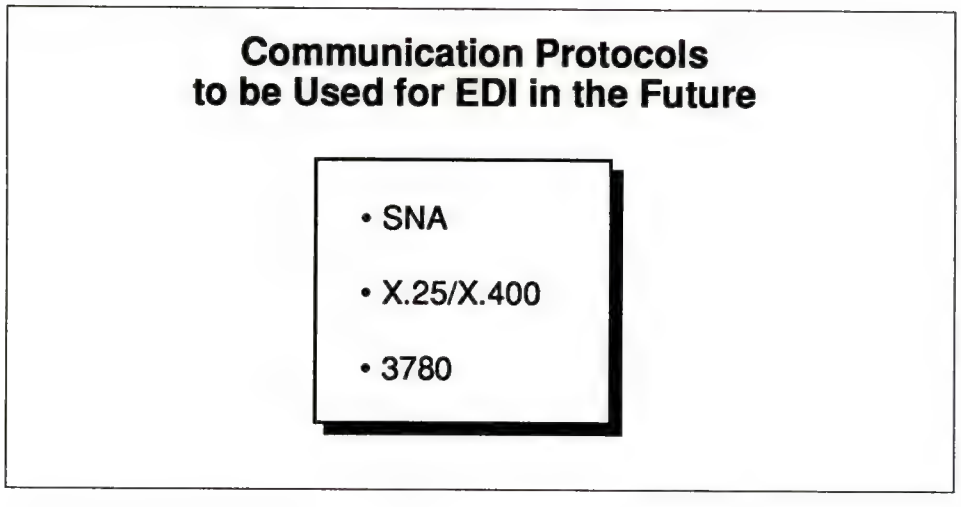
- X.25/X.400—Only a small number of large corporations are using this protocol, but more and more customers are giving it attention and requesting it. In the future, most large (Fortune 1000) companies will use it.

Use of communication protocols points to the following trends:

- Big companies and companies using IBM communication products will use SNA.
- Midsized and large companies will use X.25.
- Small companies using asynchronous dial-up data communication methods will use 3780.

Exhibit IV-8 lists the protocols expected to be widely used in the future.

EXHIBIT IV-8



B Network Services

1. Summary of Trends

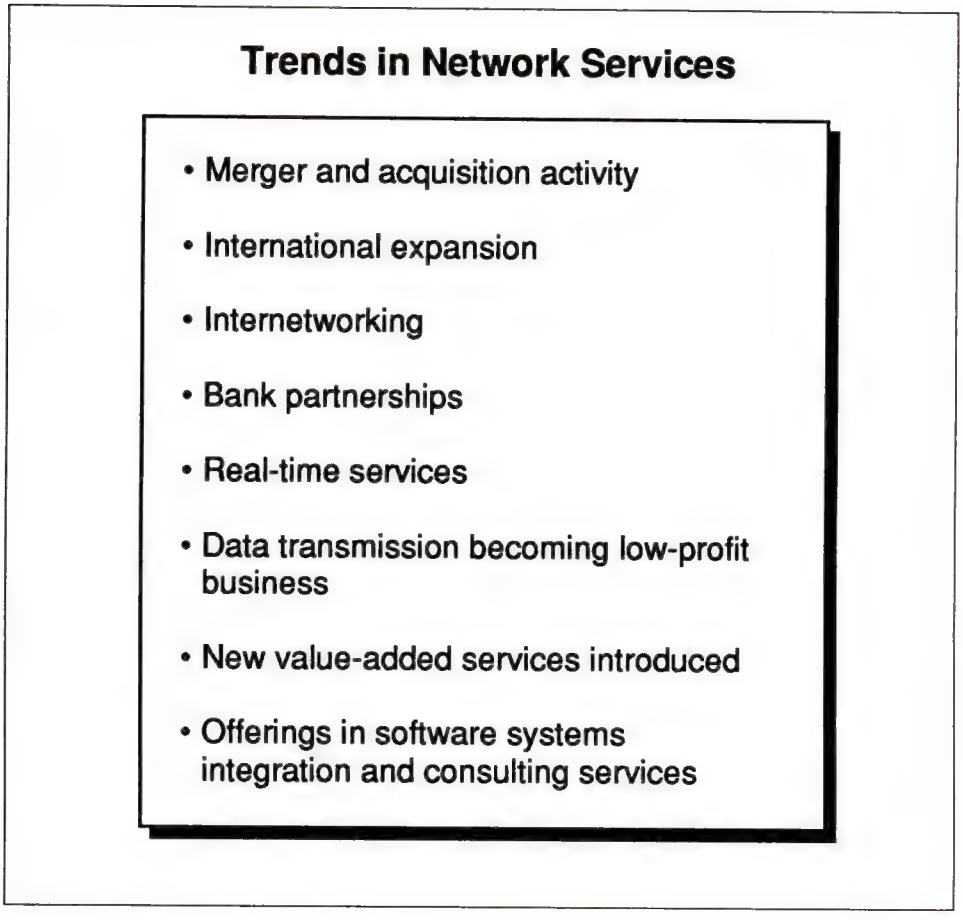
Exhibit IV-9 summarizes the trends in network services.

The following trends are apparent among network service providers:

a. Mergers and Acquisitions

To extend geographic reach and to buy market share, major acquisitions have taken place. Of particular note has been the purchase of McDonnell Douglas' Tymnet network by British Telecom, and the purchase of ISTEL (of the U.K.) by AT&T. Also, service providers have purchased software companies (e.g., Sterling Software bought Metro-Mark).

EXHIBIT IV-9


Trends in Network Services
• Merger and acquisition activity
• International expansion
• Internetworking
• Bank partnerships
• Real-time services
• Data transmission becoming low-profit business
• New value-added services introduced
• Offerings in software systems integration and consulting services

b. International Expansion

Closely related to acquisition activity, leading service providers are aggressively developing global network capacity either through alliances, partnering with PTTs, or the installation of wholly owned facilities. GEIS and AT&T are building more switching centers in Europe and Asia. Sterling Software Ordernet has made an alliance with a Japanese VAN (Global VAN Japan). Infonet (25% owned by MCI) is interconnected with several PTTs in Europe and with other VANs around the world.

c. Internetworking

All leading VANs are interconnected. However, X.400 is not yet the medium of interconnection for EDI message traffic despite its use for E-mail interconnection among the same VANs. The 3780 protocol is being widely used to interconnect public networks.

d. Partnerships with Banks Formed to Provide EDI/EFT Services

Leading service providers are deciding not to become banks and banks are deciding not to become service providers. Instead the two are partnering to offer payment services. According to this arrangement, corporations pay suppliers electronically by transmitting payment instructions to their bank via the service provider's network. The bank acts on these instructions by sending electronic payments to the supplier's bank via the banking industry's Automated Clearinghouse or, if the supplier's bank does not have the capability of receiving an electronic payment, by sending a check in the mail. The service provider communicates the remittance information to the supplier via its network.

IBM Information Network has joined with First Chicago Corporation (parent of First National Bank of Chicago) to provide an electronic payment service called PayStream. Sears Communications Company has allied with eight U.S. banks to provide payment services (Bank of America, Continental Bank, CoreStates Financial Corp., First Wachovia, Harris Bank, Mellon Bank, National Bank of Detroit, and the Northern Trust Bank. BT/Tymnet and The Sequor Group (the processing arm of Security Pacific Corporation, the holding company of Security Pacific Bank), have allied to provide payment services.

e. Real-Time Communication Sessions for EDI

The impact of real-time communication on OSI architecture is unknown. ISDN lines have yet to be used for EDI.

f. Data Transmission Becoming a Commodity, Low-Profit Business

Value-added services are migrating to customer premises (data format translation, store-and-forward mailboxing, etc.). The data communication business is highly competitive.

g. New Value-Added Services Are Being Introduced

Introduction of value-added services is in response to data transmission becoming a commodity business. Some service providers are going beyond offering basic data transport functions to customers. EDI data bases, media conversion services, and transferring binary files (e.g. CAD/CAM files, spreadsheets) with EDI documents, are new services that are successfully being marketed.

Commercial EDI data bases are generally of two types. Product catalogs (offered by IBM and GEIS) allow retailers and apparel suppliers to keep product listings, UPC bar codes, and prices synchronized. Transaction data bases (offered by Sterling Software Ordernet) track EDI message traffic to compile statistical reports on sales and distribution activities.

Media conversion services are aimed at trading partnerships in which one partner is EDI-capable and the other is not. All EDI messages emanating from the EDI-capable partner are converted to facsimile, E-mail, telex, or paper mail media and forwarded to the non-EDI-capable partner by the service provider. Some service providers offer reverse services as well—they will input data from non-EDI media. Western Union and Sterling Software Ordernet are providing these services. Smaller service bureaus in the automobile industry are also providing similar services.

Sending binary files attached to EDI messages is being done by GEIS in its Design*Express service, and by software provider Supply Tech.

h. The Offering of Software

GEIS, IBM, and Sterling Software Ordernet have a complete line of EDI translation software in addition to their network services. Some of the packages of GEIS and IBM link customers only to their respective networks and not to others.

i. The Offering of Systems Integration Services

IBM offers turnkey EDI solutions to large and small customers.

j. The Offering of Educational and Consulting Services

EDI requires a long sell cycle. It is very education-intensive. Potential users must understand many issues, business and technical, before making an informed decision about adopting EDI. Thus, many network service firms are offering educational support to companies. Such support typically consists of one- or two-day seminars. Although many of the seminars charge admission fees ($600 to $1,000 per person per seminar), they are viewed by service providers as critical marketing tools.

2. Commonalities in Successful Service Provider Offerings

Today's successful EDI service providers are those who have won market share over the past eighteen months. These are Sterling Software/ Ordernet, GE Information Services, and Harbinger Computer Services.

All three vendors have the following features in common:

- All three offer an EDI implementation program for large accounts that want to bring in many trading partners.
- All three offer EDI software for customer premise data format translation.

- All three pursue a hub and spoke sales approach. In other words, they sell network services to a large company and to that company's trading partners.
- All three maintain an industry marketing orientation. Sterling is targeting grocery, pharmaceutical, transportation, hardlines, and retail. GEIS is targeting retail, oil, manufacturing, transportation, and banking. Harbinger has targeted utility companies and their suppliers.

C
Software Products

1. Summary of Trends

Exhibit IV-10 lists the trends in EDI software offerings.

EXHIBIT IV-10

Trends in EDI Software Offerings

- Migration of value-added network services to customer site software
- Event-driven and real-time architectures
- EDI interfaces built into application programs
- Inexpensive translation software
- EDI/EFT software

a. Migration of Value-Added Network Services to Customer Site Software

The most notable value-added service, once offered almost exclusively by third-party VANs but now done on customer premises, is data format translation. The definite trend in EDI is for users to perform their own translation. This is certainly the case for customers with mainframe and midrange computers who conduct or plan to conduct large volumes of EDI. However, even small companies, because of the proliferation of available micro-based translation software packages, are adopting on-site translation.

Use of the X.400 standard also promises to accelerate this trend. As messaging systems of large corporations are interconnected with public data networks using X.400 gateways, EDI will increasingly use X.400 envelopes. The special VAN services for EDI (i.e., compliance checking) will fade in usage.

Moving store-and-forwarding "mailbox" functions to the customer site is becoming more common. A new generation of translation software specifically meeting communication needs is emerging. Software is available from vendors such as Mpact EDI Systems, Digital Equipment Corporation, American Business Computer, Stratus, Harbinger, GE Information Systems and Tandem that perform store-and-forward mail-boxing functions. Trading partners can dial directly to these systems using telephone lines. This new generation of software provides extensive security, fault tolerance, high-volume capacity, and high processing capacity. Furthermore, such software is intended to act as an application gateway/server for corporations with internally dispersed systems/ applications.

b. Event-Driven and Real-Time EDI Architectures

Newly offered customer-premise software will move EDI messages in and out of applications on an as-needed basis instead of according to a rigidly predetermined batch schedule. Such software, instead of moving messages from application to translator and back again in batches, prioritizes messages. It moves important ones quickly through processing sequences while holding others for traditional batch processing. For example, a purchase order from a customer who is operating in just-in-time mode could be moved by the receiving company's translator directly into the company's order entry system, and other non-JIT purchase orders would queue up for evening processing.

c. EDI Interfaces Built into Application Programs

Some application software vendors, such as American Computer, Oracle, and Digital Equipment Corporation, are facilitating the integration of EDI translation software with applications software by building interfaces into the applications software. Application software most often targeted for such interfaces includes that for purchasing, order entry, warehouse/ shipping, and accounts receivable/payable.

d. Inexpensive EDI Software Designed for Single Trading Community, "Turnkey" Implementations

More and more large companies are requesting that all trading partners—even small suppliers who do small trade volumes—be up and running on EDI. These small trading partners are not willing to spend $10,000 just to satisfy a single client. Instead, they buy stripped-down PC software for

less than $1,000. It allows them to communicate with the large company much like a facsimile machine: with no integration with internal applications, limited to communication with only a single network. VANs such as IBM and Harbinger are pushing this concept. A handful of independent software vendors (Baggerly & Associates, Lloyd Bush Inc., DNS) are focusing on this niche, but potentially large, market.

e. EDI/EFT Software

Two markets exist in the EDI/EFT arena: software at the user site and software at bank sites. General Electric Information Services is marketing its Customer Originated Electronic Payments system to corporations. It initiates payment transactions between a corporation and its suppliers, designed to go through banking intermediaries. Shared Financial Systems (in partnership with Stratus Computer, Inc. and EDI Solutions, Inc.) is pursuing the banking industry with software that receives, processes, and sends customer-initiated payment instructions.

D
Professional Services

1. Background

INPUT's research has discovered that only 30% of EDI users receive assistance from an outside source in implementing EDI. Assistance was provided most often by a network or software provider.

Although the initial implementation may have been largely handled by existing staff, INPUT believes that professional service consultants are being called upon to assist in advancing the original installation towards fuller integration with systems, and for upgrades from pilots based on PCs to full production systems hosted on mainframes.

Nearly 90% of users report that they have integrated EDI software with applications by themselves. In only 5% of the cases is it reported that the EDI software provider was used for this job.

The applications that users most typically integrate with EDI are (in descending order of frequency) order-entry systems (67% of EDI installations), shipping freight bills/bills of lading (33%), purchasing systems (31%), billing systems (22%), accounts receivable (21%), inventory management (19%), logistics (15%), and accounts payable (15%).

2. Market Segments

The EDI professional service market can be divided into four segments: software development, consulting, education/training, and systems operations (sometimes called facilities management).

a. EDI Software Development

Services provided for EDI software development include user requirements definition, systems design, data base design, programming, testing, system modification, and documentation.

Market activators of this segment are:

- Conversions from microcomputer to minicomputer or mainframe-based EDI implementations
- Integration of EDI and applications such as order entry and accounting modules

Providers to this segment are:

- Application software firms such as Management Science America (Atlanta, GA) and Integral Systems (Walnut Creek, CA)
- Data communication specialists such as turnkey systems vendor Microbilt Corporation (Atlanta, GA)
- Network services firms such as GE Information Services (Rockville, MD) and Control Data Corporation (Minneapolis, MI)
- Banks such as First Chicago, National Bank of Detroit, and Security Pacific National Bank (Los Angeles, CA)

b. Consulting

Consulting plays two distinct roles in the EDI world:

- Cost/benefit analysis consulting boosts overall EDI sales. More than 65% of the professional services firms surveyed by INPUT use cost/benefit analyses to help the sales process.
- Consulting activities that focus on the strategic role of EDI in large corporations give "pure" management consulting firms (such as McKinsey & Company and Booz, Allen, Hamilton) entree to the EDI market.

Services provided include identifying third-party networks, evaluating network suppliers, selecting communications and translation software, installing translation software, data mapping between translator and application software, software security auditing, and information services management (positioning EDI in strategic information systems programs such as just-in-time or computer-integrated manufacturing).

Providers of consulting services are:

- Big accounting firms (Anderson Consulting, Price-Waterhouse, Deloitte-Touche, Ernst & Young)
- General management firms (A.T. Kearney, Arthur D. Little, McKinsey & Company, and Booz, Allen, Hamilton)
- Independent consultancies such as EDI Education (Oak Park, IL), EDI Spread the Word (Dallas, TX), EDI Strategies (Marietta, GA), The Constell Group (Tenafly, NJ), Strategic Dimension Ltd. (Toronto, Canada), The EDI Group (San Francisco, CA), and R.J. York & Associates (Minneapolis, MN)
- Bank EDI consulting services such as Security Pacific (Los Angeles, CA), First Chicago, National Bank of Detroit, and Pittsburg National Bank

c. Education and Training

Education and training is the smallest segment in EDI professional services, but based on the number of EDI training and education seminars available, its growth has been accelerating.

Education and training services are important because:

- They are the foundation upon which vendors gain access to users.
- Users quickly learn about the benefits of EDI and are exposed to its technical aspects.

Providers to this segment are:

- Industry associations such as TDCC/EDIA, the National Industrial Transportation League, American Trucking Association, American Electronics Association, and Uniform Code Council
- Professional training organizations such as Technology Transfer Institute (Santa Monica, CA), and American Management Association (New York, NY)
- Colleges and Universities. Several large colleges and universities are offering courses on EDI (Harvard, MIT, Brigham Young University, University of Ohio, University of Wisconsin).

d. Systems Operation

This professional service, through which a vendor operates data processing centers for a fixed fee, has a narrow appeal in the EDI environment.

However, INPUT identified one situation in which an EDI vendor operated an EDI facility for a federal government agency. In this circumstance, a system operations contract was used rather than an outright purchase of computer equipment and enabling software, so as to make use of the more plentiful operations and maintenance budgeted funds rather than procurement monies, which need to be authorized by Congress.

In another example of this approach, the Port of Baltimore implemented the ACROSS service to electronically support trade and customs documentation requirements. ACROSS is operated by Network Solutions (Vienna, VA) under subcontract with Andersen Consulting.

3. Trends in EDI Professional Services

The rapid growth of the EDI professional services market has led to:

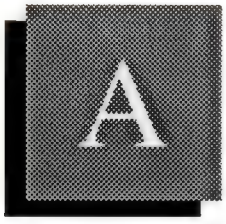
- Segmentation of vendors by users
- Differentiation of vendor services through use of proprietary products
- Narrowing of specialized alliances between computer equipment vendors and professional services firms

User firms are segmenting the market based on the size of the EDI professional services firm. The largest manufacturing, financial services, transportation, and utility organizations generally require the largest professional services firms. Users divide the EDI professional services market into vendors with unique capabilities and those offering "plain vanilla" services.

Vendors have developed proprietary products or methodologies for integrating EDI software with non-EDI applications, evaluating EDI software, exchanging files with computer-aided design data, and managing projects.

A key characteristic of the professional services business is the flexible relationship between computer equipment vendors and vendors providing mainly services. In this segment, equipment vendors may team with professional services vendors for one project, then compete vigorously with one another for a different project.

In the next two or three years, EDI professional services vendors are likely to form alliances with specific equipment vendors. This new marketing approach will result from the increasing level of specialized knowledge required, and the smaller service vendors' inability to make a substantial investment in training internal staff on multiple hardware and EDI software products.



Appendix: Standards Organization Profiles

TRANSPORTATION DATA COORDINATING COUNCIL
Transportation Data Coordination Committee/
Electronic Data Interchange Association
225 Reinekers Lane, Suite 550
Alexandria, VA 22314
telephone: 703-838-8042
fax: 703-838-8038

Jerome Dreyer, Chairman

The Company

The Transportation Data Coordinating Committee/Electronic Data Interchange Association (TDCC/EDIA and up until 1988 called only TDCC) was the first EDI standards organization in the United States and founded in 1969.

Areas of Standardization

The focus of the TDCC/EDIA is the development of standards for the transportation industries: rail, motor, air, and ocean. It also supports standards development in the chemical industry, particularly those chemical industry standards related to the transport of chemicals.

TDCC/EDIA performs a secretarial role in the development of standards in the transportation industries. Industry-specific groups, such as the American Trucking Association, the Chemical Industry Data Exchange (CIDX), and the American Association of Railroads, maintain their own EDI standards-setting committees.

Industry-group committees, composed of corporate representatives, discuss and design standards. TDCC/EDIA keeps the standards on file and publishes implementation guidelines for the standards.

TDCC/EDIA has a standards maintenance committee for each industry group (rail, motor, air, ocean, and chemical).

Also, TDCC/EDIA sponsors many educational seminars around the country explaining how to implement EDI to transportation companies.

TDCC/EDIA holds an annual EDI conference (usually in December in Washington, D.C.) and has begun to hold an annual

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page # for
Final report 5/90

page # for
.11 Interim Project
Review 4/90

"Users Congress" conference during the summer in association with the EDI Council of Canada.

Relation to Other Standards and Standards Bodies

During 1990, TDCC/EDIA will transfer the responsibility of maintaining transportation standards over to the Accredited Standards Committee for the ANSI X12 standard. The standards maintenance committees in TDCC/EDIA will be dissolved. After the transition process, all TDCC standards will be maintained through ASC X12 and kept at DISA. TDCC/EDIA will still publish implementation guidelines and conduct educational seminars.

Membership in TDCC/EDIA is by corporation. Currently, there are 350 member companies that belong. These companies are primarily user companies.

Trends in Communication Protocols

TDCC/EDIA does not develop standards for communication protocols. It makes no recommendations regarding protocols.

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EDI STANDARDS BODY PROFILE

AMERICAN NATIONAL STANDARDS INSTITUTE
Data Interchange Standards Association, Inc.
(X12 Secretariat)
Suite 355
1800 Diagonal Road
Alexandria, Virginia 22314
tel: 703-548-7005

Kenneth Hutcheson, Chairman ASC X12;
EDI Manager, E.I. du Pont
Harriet Rusk, Secretariat, DISA

The Organization

The American National Standards Institute's (ANSI) Accredited Standards Committee (ASC) X12 is charged with the development and maintenance of EDI standards for general business use.

ANSI was founded in 1918 to coordinate the development of commercial and industrial standards in the United States. Today, ANSI guides the efforts of over 250 major standards developing organizations in the U.S. on both a national and international level.

The ASC X12 is the group for EDI. Any company can join the ASC X12 and send representatives to work in the development of EDI standards. In January, 1990, the number of member companies totalled 360.

The secretariat of ASC X12 is the Data Interchange Standards Association (DISA), an open-membership, not-for-profit organization.

Areas of Standardization

ANSI ASC X12 is committed to developing standardized data formats (called, "transaction sets") for the transmission of data among applications.

X12 does not develop communication protocol standards. It is not concerned with the protocols outside of the envelope in which standardized data is sent.

X12 publishes short, guideline papers that advise X12 users about how to use different protocols for transmission. It neither recommends nor discourages the use of particular protocols.

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ASC X12 is organized into a series of subcommittees responsible for standards development and maintenance in their fields. ASC X12's current structure is shown in the exhibit below.

The subcommittees are divided among those dedicated to:

* Transaction-set development for business functions. These are Communications, Finance, Materials Management, Purchasing, Product Data, Transportation, and Government.

Typical transaction sets developed by these committees are the purchase order, the invoice, the advanced shipping notice, etc. A complete listing of transaction sets (production and in development) of the ANSI ASC X12 listed in the following appendix.

* Education and Implementation support and Technical Assessment of proposed standards and changes to existing standards.

* Transitioning other non-X12 EDI standards, particularly UCS, WINS and TDCC, into the X12 structure. This subcommittee is called the Industry Transitional Subcommittee.

* A new subcommittee is being proposed for the maintenance and development of Distribution and Warehousing transaction sets. This subcommittee will also transition those transaction sets belonging to the UCS/WINS standards families into the X12 family.

Relation to Other Standards and Standards Bodies

Groups such as the Voluntary Interindustry Communication Standard (VICS), Automobile Industry Action Group (AIAG), Petroleum Industry Data Exchange (PIDX), Electronic Industry Data Exchange (EIDX), and Chemical Industry Data Exchange (CIDX), are industry-specific groups that use X12 standards (which are highly generic in nature).

These groups write implementation guidelines for their special use within their industry. These groups do not write EDI standards on their own. Some may write other kinds of standards. For example, the AIAG writes its own bar-code standards.

Groups such as the TDCC/EDIA, UCS and WINS are standards bodies with their own families of extent standards. Work is underway to bring these standards families under the X12 umbrella.

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In 1989, the ASC X12 established the Industry Transitional Subcommittee (ITS) for the purpose of merging non-X12 U.S. EDI standards into the X12 format.

The rule for merging outside standards into X12 ones is that outside transaction sets that are not similar to existing X12 transaction sets will be adopted as X12 transaction sets (after preparing them so that they conform to ASC X12 syntax and are in the proper X12 presentation format).

Those outside transaction sets that are similar in function to X12 transaction sets will require reconciliation. Typically, the existing X12 formats will have to be expanded. In general, the X12 transaction sets are less efficient than UCS/WINS since they are much more generic in nature. The UCS/WINS, serving the wholesale/retail distribution sector, evolved in a much more focused industry group than are the X12, which purport to serve all industries in the economy. In many cases it will take more X12 segments to provide the same information as represented by UCS/WINS transactions.

Some differences that need to be reconciled between UCS/WINS and X12 are:

* The hierarchical structure of X12 shipping notices would require a new looping concept for UCS and WINS.

* The UCS purchase order allows for a multi-point delivery specification which the X12 does not yet have.

EDIFACT

ASC X12 is the U.S. body responsible for contributing to the United Nations work on EDIFACT. The North American EDIFACT Board (NAEB), which advises the North American Rapporteur, is a standing task group of ANSI X12.

Furthermore, each subcommittee in X12 has a task group dedicated to EDIFACT standard development. Mutually developing a format is considered a good strategy. Domestic data-format requirements can be incorporated into the international standard.

The work done on EDIFACT standards is put before the entire X12 membership for vote. If approved, it becomes the U.S. position on EDIFACT in international negotiations.

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An ad hoc task group may be formed in X12 to reconcile the syntactical differences between X12 and EDIFACT formats.

Trends in Standardization

The X12 organization is inherently domestic in its focus and constitution, while EDIFACT is inherently international in its outlook. This means that EDIFACT will focus on messages used in interantional trade.

EDIFACT was intended to replace disparate European and North American standards; however, there is clearly work to be done.

* Although there has been discussion of a migration from ANSI X12 to EDIFACT, INPUT believes it may take up to a decade for the development of a single set of standards.

* INPUT believes that both sets of standards will develop in parallel during the interim. Companies and industry groups will choose between them based on their business needs, the requirements of their trading partners, the basic nature of ltheir commerce, and the availabitlity of suitable transaction sets.

Trends in Communication Protocols

The ANSI ASC X12 body does not develop standards for communication protocols. However, participants in the ASC are aware of the need to accomodate current EDI data formats to the OSI model and, in particular, the X.400 standard.

Many X12 participants also participate in the CCITT standards development committees. CCITT is working to define an X.400 protocol for an EDI "body type." This particular version of X.400 is being called P-EDI. A draft is expected by June, 1990.

Accomodating current X12 EDI data formats to X.400 involves moving address information from the X12 envelope to the X.400 envelope. Also required is to develop a way to indicate the content of the EDI interchange to allow for selective processing.

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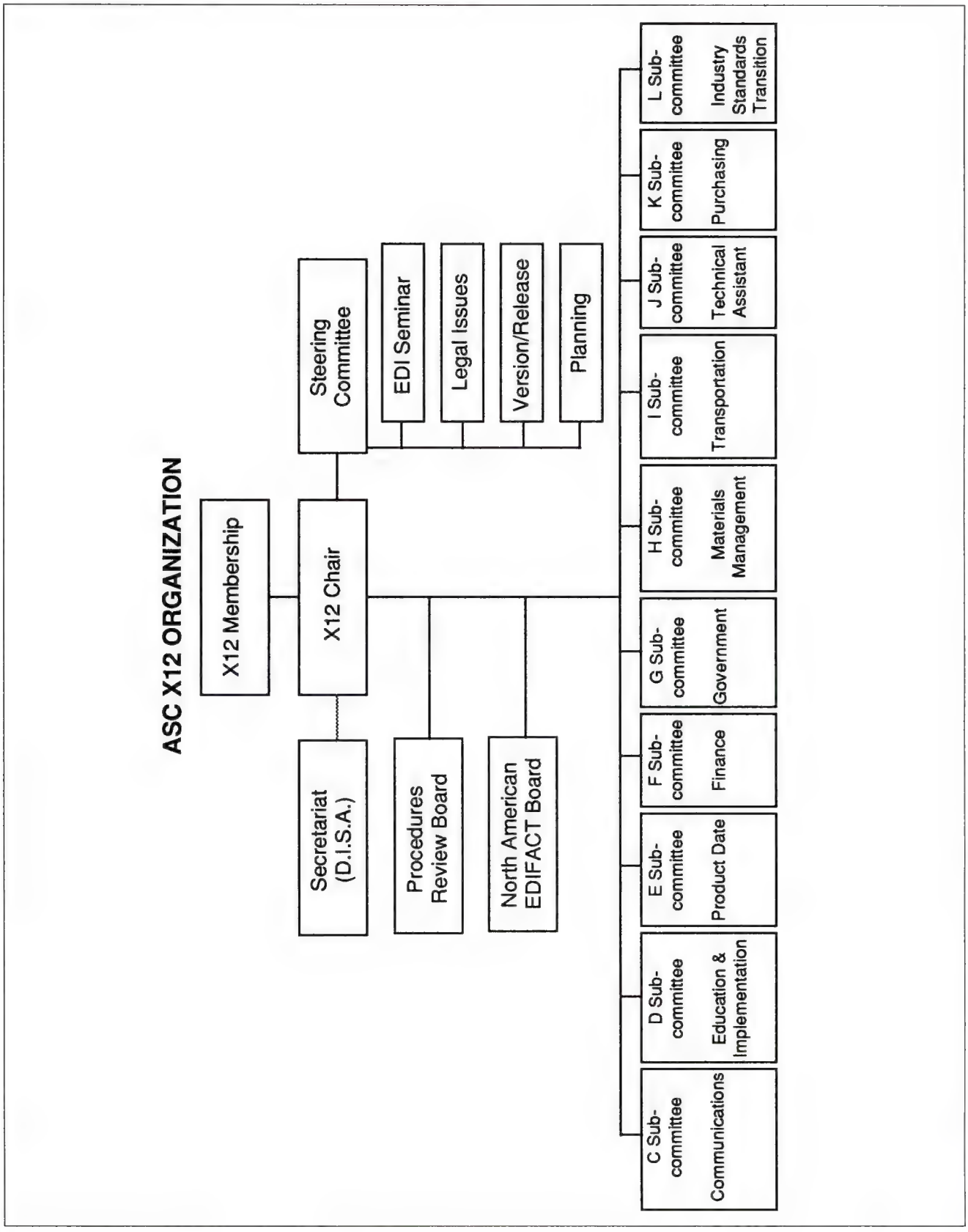
EXHIBIT IV-1



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Standards Activities—Quick Summary

dpANS = draft proposed American National Standard
ANSI-YEAR = American National Standard, Year of Publication
RELEASES = X12 Draft Standards For Trial Use (DSTU)

ID#	REF#	Title	Availability/Status
Transaction Sets and Other Standards			
104	X12.100	Air Shipment Information	In Development
110	X12.101	Air Freight Details and Invoice	In Development
114	X12.102	Air Shipment Status Message	In Development
204	X12.103	Motor Carrier Shipment Information	In Development
210	X12.104	Motor Carrier Freight Details and Invoice	In Development
213	X12.105	Motor Carrier Shipment Status Inquiry	In Development
214	X12.106	Motor Carrier Shipment Status Message	In Development
217	X12.107	Motor Carrier Loading and Route Guide	In Development
218	X12.108	Motor Carrier Tariff Information	In Development
300	X12.109	Functional Group Totals	In Development
301	X12.110	Reservation (Booking Request - Ocean)	In Development
303	X12.112	Confirmation (Ocean)	In Development
304	X12.113	Shipping Instructions Ocean	In Development
310	X12.118	Freight Details and Invoice Ocean	In Development
312	X12.119	Arrival Notice Ocean	In Development
313	X12.120	Shipment Status Inquiry Ocean	In Development
315	X12.122	Status Details Ocean	In Development
322	X12.127	Terminal Operations Activity Ocean	In Development
323	X12.128	Vessel Schedule and Itinerary Ocean	In Development
324	X12.129	Vessel Stow Plan Ocean	In Development
361	X12.136	Carrier Interchange Agreement Ocean	In Development
404	X12.138	Rail Carrier Shipment Information	In Development
410	X12.139	Rail Carrier Freight Details and Invoice	In Development
411	X12.140	Freight Details and Invoice Summary Rail	In Development
417	X12.141	Rail Carrier Waybill Interchange	In Development
418	X12.142	Rail Advance Interchange Consist	In Development
419	X12.143	Advance Car Disposition	In Development
420	X12.144	Car Handling Information	In Development
425	X12.149	Rail Waybill Request	In Development
426	X12.150	Rail Revenue Waybill Response	In Development
427	X12.151	Rail Waybill Response	In Development
429	X12.35	Railroad Retirement Activity	In Development
431	X12.65	Railroad Station Master	In Development
440	X12.152	Shipment Weights	In Development
499	X12.170	Application Acceptance Rejection Advice	In Development
622	X12.173	Intermodal Ramp Activity	In Development
810	X12.2*	Invoice	ANSI-86, Release 1-2-3-4

* dpANS scheduled for concurrent X12 ballot and public review 4/90

ID#	REF#	Title	Availability/Status
811	X12.39	Consolidated Service Invoice/Statement	In Development
812	X12.40	Credit/Debit Adjustment	In Ballot
813	X12.62	Electronic Filing of Tax Returns	In Development
814	X12.61	Residential Mortgage Loan Application	In Development
815	X12.42	Cryptographic Service Message	In Ballot
816	X12.66	Organization Relationship	In Development
817	X12.67	Electronic Routing and Acknowledgment	In Development
818			
819	X12.43*	Operating Expense Statement	Release 3-4
820	X12.4*	Payment Order/Remittance Advice	Release 1-2-3-4
821	X12.24	Financial Information Reporting	Release 4
822	X12.25*	Customer Account Analysis	Release 3-4
823	X12.38*	Lockbox	Release 2-3-4
824	X12.44	Application Advice	In Ballot Comment Resolution
825	X12.46	Payment Status Report	In Development
826	X12.19	Tax Information Reporting	In Ballot
827	X12.47	Financial Return Notice	In Subrelease 041
828	X12.45	Payment Status Inquiry	In Development
829	X12.48	Payment Cancellation Request	In Subrelease 041
830	X12.14*	Planning Schedule with Release Capability	ANSI-86, Release 1-2-3-4
831	X12.49	Control Totals	In Ballot Comment Resolution
832	X12.13*	Price Sales Catalog	ANSI-86, Release 1-2-3-4
833			
834			
835			
836	X12.54	Contract Award	In Ballot Comment Resolution
837			
838	X12.17	Trading Partner Profile	In Development
839	X12.31	Project Plan and Status Report	In Development
840	X12.7*	Request for Quotation	ANSI-86, Release 1-2-3-4
841	X12.51	Specifications/Technical Information	In Reballot
842	X12.21	Nonconformance Report	In Development
843	X12.8*	Response to Request for Quotation	ANSI-86, Release 1-2-3-4
844	X12.26*	Product Transfer Account Adjustment	Release 3-4
845	X12.27*	Price Authorization Acknowledgment/Status	Release 3-4
846	X12.28*	Inventory Inquiry/Advice	Release 1-2-3-4
847	X12.63	Material Disposition	In Development
848	X12.36	Material Safety Data Sheet	In Development
849	X12.50*	Response to Product Transfer Account Adjustment	Release 3-4

* dpANS scheduled for concurrent X12 ballot and public review 4/90

ID#	REF#	Title	Availability/Status
850	X12.1*	Purchase Order	ANSI-86, Release 1-2-3-4
851			
852	X12.52	Product Activity Data	In Ballot
853	12.64	Routing and Carrier Instruction	In Development
854			
855	X12.9*	P.O. Acknowledgment	ANSI-86, Release 1-2-3-4
856	X12.10*	Ship Notice/Manifest	ANSI-87, Release 1-2-3-4
857	X12.29	Shipment and Billing Notice	In Development
858	X12.18	Shipment Information	Release 4
859	X12.55	Freight Invoice	In Ballot Comment Resolution
860	X12.15*	P.O. Change	ANSI-86, Release 1-2-3-4
861	X12.12*	Receiving Advice	ANSI-86, Release 1-2-3-4
862	X12.37*	Shipping Schedule	Release 2-3-4
863	X12.41*	Report of Test Results	Release 3-4
864	X12.34	Text	Release 4
865	X12.16*	P.O. Change Acknowledgment	ANSI-86, Release 1-2-3-4
866	X12.57	Production Sequence	In Subrelease 041
867	X12.33*	Product Transfer and Resale Report	Release 2-3-4
868	X12.30	Electronic Form Structure	In Ballot Comment Resolution
869	X12.11*	Order Status Inquiry	Release 2-3-4
870	X12.23*	Order Status Report	Release 2-3-4
879	X12.60	Price Change	In Development
920	X12.174	Loss or Damage Claim - General Commodities	In Development
924	X12.175	Loss or Damage Claim - Motor Vehicle	In Development
925	X12.176	Claim Tracer	In Development
926	X12.177	Claim Status Report and Tracer Reply	In Development
928	X12.178	Automotive Inspection Detail	In Development
980	X12.179	Functional Group Totals	In Development
990	X12.180	Generalized Feedback	In Development
996	X12.32	File Transfer	In Ballot Comment Resolution
997	X12.20*	Functional Acknowledgment	ANSI-86, Release 1-2-3-4
998	X12.181	Set Cancellation	In Development
	X12.3*	Data Element Dictionary	ANSI-86, Release 1-2-3-4
	X12.5*	Interchange Control Structures	ANSI-87, Release 2-3-4
	X12.6	Application Control Structures	ANSI-86, Release 4
	X12.22*	Segment Directory	ANSI-86, Release 1-2-3-4
	X12.56	Interconnect Mailbag Structures	In Development
	X12.58	Security Structures	In Ballot
	X12.59	Semantic Support	In Development

* dpANS scheduled for concurrent X12 ballot and public review 4/90

Guidelines

PUBLISHED

ASC X12/88-035	Transfer of X12 Data Using Asynchronous or Binary Synchronous Communication Protocols
ASC X12S/89-398	EDI Asynchronous Guideline
ASC X12C/89-525	Compliance with X12 Guideline
ASC X12B/88-040	ASC X12 Design Rules and Guidelines (also in Revision)

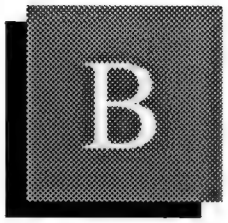
IN DEVELOPMENT OR X12 BALLOT

ASC X12S/88-296	X.400 Communication Guideline For EDI
ASC X12C/89-535	Names and Addresses in X12 Guideline
ASC X12E/89-441	Total Quality Management (TQM) Guideline
ASC X12D/TG1/89-618	Industry Implementation Guidelines Reference Manual
ASC X12C/TG3/89-460	EDI Network Interconnect Questionnaire Guideline
ASC X12C/TG3/89-493	Standard Data for Interconnect Guideline
ASC X12C/TG8/89-599	Model of X12 Functions Guideline

Interpretations

IN DEVELOPMENT

ASC X12C/89-254	Interpretation of R Data Type (In Prep for Publication)
ASC X12C/89-523	Interpretation of ID Data Type
ASC X12C/89-522	Interpretation of Functional Acknowledgment
(None)	Interpretation of "Areas" of a Transaction Set
(None)	Interpretation of Routing Reference in X12.5
(None)	Interpretation of End-to-End Interchange
(None)	Interpretation of MEA for Shipping Tolerances



Appendix: Major EDI Service Company Profiles

EDI SERVICE PROVIDER PROFILE

AT&T
tel: 201-658-6000
55 Corporate Drive
Bridgewater, NJ 08807
(201) 658-2277

EDI Contact: Gary Dalton, Manager,
National EDI Program

The Company

AT&T is the largest long distance carrier in the United States.

EDI Offering

Network Services

EDI customers will use the "AT&T EDI Network," even though the physical network is the same as the AT&T global telecommunication network.

EDI Software

AT&T offers EDI users a variety of software packages to support EDI implementation. They range from basic interfaces to integrated front-end packages.

AT&T produces its own network interface/communications software while it provides users with EDI translation software through co-marketing agreements with three independent software vendors.

AT&T sells three network interface software packages. They accomplish moving data from the EDI translator software to the network and back.

- EDI Network Interface Module/MVS, a utility module designed for use with IBM/MVS mainframes. It operates on the customer's processor, wrapping outgoing EDI data in a Message Transfer Architecture (MTA) Envelope. For data received via the AT&T EDI Network, it removes the MTA envelope. The module provides X.400 routing and audit trail information to the AT&T EDI Network. It also provides log files and status reports on the user's platform to track the interchanges sent and received.

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- UNIX and PC EDI Network Interface Modules, modules that perform MTA wrapping as above, but for specific PC and UNIX environments.

- EDI 3780 Dial-Out Utility, conducts a 3780 communications session with the AT&T EDi Network from an IBM/MVS-compatible mainframe.

Through co-marketing agreements, AT&T offers the following three EDI translation software packages:

- STX12 by Supply Tech, Inc., a translator for MS-DOS microcomputers. Supports just X12 standards.

- EDI/36, EDI/38 and EDI/4XX by ACS Network Systems, translators for IBM mid-range computers. Supports X12, UCS, EDIFACT, and TDCC standards.

- EDItran, by EDI Solutions, a translator for MVS and VSE environments of IBM 30XX and 43XX mainframes. Supports just X12 standards.

Consulting

AT&T provides customers with help in connecting to its network as part of its network services charge. AT&T also provides integration support (linking EDI communications with internal applications) on a fee basis.

AT&T offers support in the planning, development, and implementation of EDI.

Support services are available "a la carte," so that customers and their partners can contract for only those services that they need.

Support services range from basic executive briefings on the principles and strategic applications of EDI, to on-site technical support for interface and connectivity issues.

AT&T also provides customized implementation support for individual trading partners as needed, as well as coordinated group seminars for a company and its trading partners.

AT&T also recommends third party consultants (such as Price Waterhouse) or the consulting services of its allied translation software vendors.

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Education and Training

AT&T sponsors the independent training organization, EDI Education, to hold six seminars per year. These provide a general background to uninitiated corporate MIS personnel regarding EDI. Also, AT&T will put on implementation seminars at the customer's premises on a per-request basis.

Related Network Services

AT&T EDI is part of AT&T's Global Messaging Services strategy -- a complete service/product platform that provides electronic data interchange, electronic mail, and facsimile services on a single messaging network.

The network provides store-and-forward features even for fax transmissions. EDI and E-mail can be sent in a single telecom session using X.400.

Customer Base

User Characteristics

EDI customers, not revealed by AT&T officials, are of many industry types. However, aerospace, petrochemical, and telecommunications companies are strong.

Also, AT&T leverages its already powerful position as the strategic telephone vendor for large corporations. It is a strategic telecommunications vendor for corporations providing voice and data services.

Key Users

One of the largest customers is AT&T itself and its supplying of equipment to the Regional Bell Holding Companies (RBOCs).

Marketing

Market Share

Despite its well-established data network, AT&T has approximately 100 EDI customers. It has a negligible market share in the EDI network market.

Sales and Service Locations

AT&T maintains 70 people total in its EDI group. These people can be contacted through local offices.

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Start Up Procedures

Varies according to customer. For smaller companies, AT&T will simply offer communications software already programmed with user id, and passwords. It lets the translation software vendor provide support for integration, mapping, and programming trading partner profile information.

Liability for Lost Data

Not liable for consequential damages.

Pricing

For EDI services, users of AT&T's network pay the following fees:

$30 annual service fee

- $90 annual administrative fee

- $.40 for the first 400 characters sent; $1.00 for 401 to 7500 characters sent.

Technology

Network Configuration

North America: AT&T maintains three nodes -- Alfaredo, GA; Bridgewater, NJ; Denver, CO.

Worldwide: Two nodes -- one in Tokyo and one in London. Four more are planned by the end of 1990.

Interconnection Arrangements

North America: By the 3780 protocol, AT&T is connected with GEIS, BT Tymnet, Sterling Software Ordernet, TranSettlements, Sears Communications Company, Kleinschmidt, IBM Information Network, Harbinger and Control Data Corporation's Redinet.

Worldwide: AT&T is internetworked (using X.400) with the following other data networks: TeleDelta (Sweden), OTC (Australia), Telecom (Canada), Dacom (South Korea), PNT Tele (Finland), Helsinki Telephone (Finland), Dialcom/BT Tymnet (U.S./U.K.), Telenet (U.S.), KDD (Japan, TransPac (France).

The AT&T EDI Network is based on AT&T's Message Transfer Architcture (MTA). MTA is a patented unified messaging

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architecture employing CCITT MHS X.400.

Protocols Supported

AT&T's EDI Network offers the following kinds of interface options to users:

- simple and toll-free access via AT&T 800 Service.

- Synchronous, asynchronous, and X.25 connectivity.

Protocol Conversion

AT&T's nodes accept transmissions in the above protocols and convert them to X.25 for internal packet-switched routing.

Protocol Plans

AT&T is a vocal supporter of X.400 use for all messaging in the future.

EDI Formats Supported

AT&T's EDI Network supports X12, TDCC, UCS, and EDIFACT EDI formats.

Data Format Translation

Within the U.S., AT&T does not offer on-network translation (customers must do it). In the U.K., however, its Istel network provides on-network translation.

EDI and ISDN

AT&T, in conjunction with RBOCs (who provide local access), is the U.S.' stongest proponent of ISDN services.

AT&T has promoted the use of EDI in an ISDN context. The configuration has a PC with an EDI translator on it and an ISDN PC board/adapter. The PC is connected to AT&T's 5ESS ISDN switch which connects many offices of a company. All inter-company EDI traffic can be routed through the ISDN switch and into a modem which routes the traffic to locations external to the company. This is just an experiemental use of EDI at this time.

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Sources of Technology

Other than its EDI translation software, AT&T manufactures its own data communications hardware and software.

Switching Systems

Hardware: At each node site, AT&T uses four clusters of three AT&T 3B2 hi-end minicomputers. They are interlinked for redundancy and fault-tolerance. Some DEC 8600 series minicomputers may still be in operation at node sites, but AT&T is phasing them out.

Software: Running on the hardware is AT&T's Data Kit Virtual Communication Switch (DK VCS) software.

Strategies and Alliances

Summary:

* Focus on and leverage its core expertise, networking.

* Use alliances with other companies to provide software, equipment, professional services, and other expertise that lay outside of its core business.

* Position itself as a full-service telecommunications provider (voice, data, image) and therefore assume the role of strategic provider/partner to a corporation.

Background:

AT&T formerly offered an EDI service called Information Interchange as part of the Net 1000 packet-switched network/remote computing service. Net 1000 was withdrawn in June, 1986 as not meeting profit objectives.

After testing EDI in various AT&T corporate units, AT&T relaunched its EDI service offering in 1989 based on its E-mail service, AT&T Mail. AT&T Mail began as a service in the United States in 1984 (the year of the AT&T divestiture).

AT&T, of all network vendors, is the strongest proponent of the OSI model and, specifically, the X.400 interconnect architecture.

AT&T sees X.400 as the best way to give its customers the greatest domestic and global reach/connectivity in their data communications needs.

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Also, with X.400, AT&T wants to position itself as the provider of one-stop messaging services, where fax, E-mail, binary file transfer, and EDI can be delivered in the same envelope making its delivery universally processable by all network switches/nodes.

AT&T is interconnected with 11 other data networks around the world (see below, Internetworking Agreements).

In September, 1989, AT&T purchased the U.K. based EDI third-party network, Istel. Istel was one of two leading EDI VANs in the U.K. (the other being INS, partly owned by GEIS). It provides EDI network services and an information management gateway service called, iNet. Istel currently has approximately 1,000 EDI corporate customers.

In February, 1990, a new company was formed in the U.K., AT&T ISTEL Global Messaging Services Limited.

The merger has effectively enlarged the connectible points of each company's network.

With the merger, AT&T Mail is available to Istel customers.

Istel, prior to the acquisition, was licensing its EDI switching software (called EDICT) to other VANs and PTTs around the world. These licensee locations provide the new company, AT&T Istel with potential strategic alliances.

The licensees at this time include: Cable & Wireless (Hong Kong), Paxus ComNet (Australia and New Zealand), An Post (Republic of Ireland), TS1 (Spain), RAET (Belgium, Netherlands, Luxembourg), Seva (Italy), and GEC (the United Kingdom).

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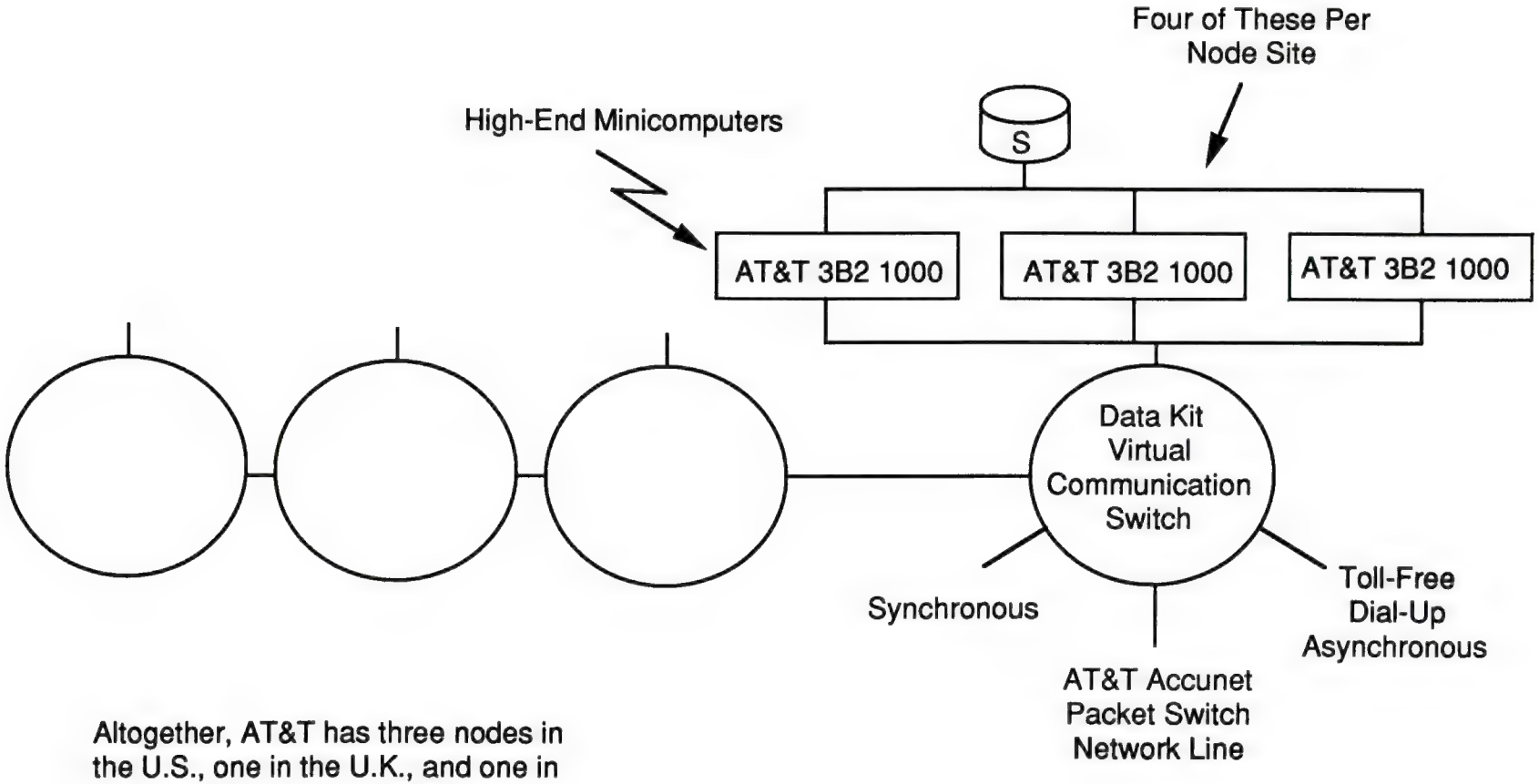
AT&T Network Node Configuration



Altogether, AT&T has three nodes in the U.S., one in the U.K., and one in Japan. More are to be built.

BELL ATLANTIC CORPORATION
1600 Market Street
Philadelphia, PA 19103
(215) 963-6000

Grover Lewis, Director of Messaging Services; Larry Plumb, Marketing Communications

The Company

Bell Atlantic Corporation is one of the seven regional holding companies formed January 1, 1984 when AT&T divested itself of the exchange telecommunications, exchange access, printed directory advertising portions of telephone company subsidiaries, and cellular mobile communications business.

EDI Offering

Bell Atlantic entered the EDI market with its agreement, signed in December 1989, with Harbinger EDI Services, an Atlanta, GA, -based EDI processing service and software vendor.

The agreement enables Bell Atlantic to market Harbinger's EDI user software and to use Harbinger's switching software (that conducts store-and-forward and processing for EDI messages) on Bell Atlantic's computers.

Bell Atlantic, however, has not yet offered EDI services to the commercial market. It promises to do so in the third quarter 1990.

Network Transmission Services

No EDI transmission services are offered at this time.

Bell Atlantic has launched an E-mail service and a gateway service (commercial databases) to E-mail subscribers in Philadelphia and Washington D.C.

By law, Bell Atlantic is confined to a six-state region to offer local dial up access ports to data communication customers (called the Local Access Transport Area -- LATA). Customers outside the region may either make long distance calls (via a long distance carrier) to reach a local access point or use another VAN to connect with Bell Atlantic.

Bell Atlantic is interconnected with 12 major VANs in the U.S. It also has reseller agreements with Telenet and BT Tymnet. For

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customers who want networking that extends beyond its LATA, Bell Atlantic resells the network services of Telenet and BT Tymnet.

EDI Software

Bell Atlantic offers no EDI software today. However, if it exercises its agreement with Harbinger it will offer Harbinger's InTouch*EDI PC software to customers. This is a $600 turnkey EDI software package that allows companies to send and receive EDI documents with the Bell Atlantic network only. The software cannot integrate with internal applications.

Consulting

No plans have been announced.

Education and Training

No plans have been announced.

Installation

No plans have been announced.

Sales and Service Locations

Bell Atlantic has hundreds of service locations throughout the states of New Jersey, Pennsylvania, Delaware, Maryland, Virginia, West Virginia, and the District of Columbia. In addition, Bell Atlantic reaches customers through authorized sales agents, dedicated account teams for large accounts, and regional account teams covering a geographic area. Sales and maintenance services are also available worldwide through the offices of the international units of Bell Atlantic.

User Start-Up Procedures

None determined at this time.

Customer Base

User Characteristics

Bell Atlantic has no EDI customers at this time.

Key Users

Not applicable.

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Marketing

Market Share

Not applicable.

Profit Centers

Bell Atlantic has received no revenues from EDI at this point, and thus profit centers are irrelevant.

Liability for Lost Data

Legal liability for EDI transmissions has not been determined. It will be different from the liability for Bell Atlantic's basic Public Data Network services. Liability on the Public Data Network varies according to the level of service contracted by the customer.

Pricing

Not determined.

Technology

Network Configuration

Bell Atlantic's Public Data Network is divided into 19 Local Access Transport Areas. Each area has hundreds of access points. The exact number was unknown by interviewee.

The company has deployed over 300,000 miles of optical fiber in its network at this time and deploys optical fiber at a rate of approximately 100,000 per year.

Interconnection Arrangements

Bell Atlantic's Public Data Network is interconnectd (via X.75 gateways) with BT Tymnet, Telenet, and AT&T's Accunet.

Interconnection with other public networks for specifically EDI services are currently not in place and are being negotiated.

Bell Atlantic has offered since 1988 E-mail services. It is reselling the E-mail service of Telenet.

Protocols Supported

Bell Atlantic supports a wide variety of protocols for customers to connect for E-mail services (most customers use asynchronous, dial up). OSI and 3780 protocols are supported.

Internally, Bell Atlantic uses X.25 packet switching protocol for

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moving messages and X.75 for interconnections with other networks.

Protocol Conversion

Bell Atlantic is still determining where in its Public Data Network it will conduct protocol conversion for EDI services. The final decision depends on rulings in the Modified Final Judgement of Judge Harold Greene's court.

Protocol Support Plans

Bell Atlantic acknowledges that OSI, ISDN and other CCITT standards will provide the architecture of its network in the future.

EDI Formats Supported

When it launches its EDI service, Bell Atlantic will just support X12 data formats. EDIFACT and other standards will not be supported.

EDI and ISDN

Bell Atlantic has made no formal strategies regarding the integration of EDI services with ISDN capabilities. Currently it has 4,000 ISDN lines installed and 25 large customers using ISDN. Later in 1990, Bell Atlantic will begin tariffin

Sources of Technology

Bell Atlantic is forbidden by law of manufacturing hardware or software. Its leading suppliers are Northern Telecom, AT&T, DEC, IBM, and Siemans.

Switching Systems

Bell Atlantic uses Siemans switching equipment and software for its public data network.

Data Format Translation

Bell Atlantic's EDI program will deploy software packages on the customer site that translates data into standard formats.

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Strategies and Alliances

Bell Atlantic will be working with its large corporate customers to extend the benefits of EDI to their smaller trading partners. Bell Atlantic will use Harbinger's much acclaimed and highly functional software in conjunction with Bell Atlantic's packet data network to offer a privately labeled Bell Atlantic EDi capability.

Bell Atlantic believes it is well-positioned to develop the market for EDI in the mid-Atlantic states. It has a strong presence with smaller businesses by virtue of its local telephone companies, and it has a widely available packet data network, which is essential to delivering EDI messages. Bell Atlantic's EDI services, which will include the provision of customer premises software, network transmission services and related consulting and training services, will be marketed to both large corporations and their small- and medium-sized trading partners.

EDI documents will be delivered to the central EDI computer over Bell Atlantic's packet data network in conjunction with a long distance, or interLATA, carrier of the customer's choice.

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EDI SERVICE PROVIDER PROFILE

GE INFORMATION SERVICES
401 North Washington Street
Rockville, MD 20850
(301) 340-4000

Hellene S. Runtagh, President
Division of General Electric Company,
Communications and Services Organization
Total Employees: 2,600
Total Revenue, Fiscal Year End
12/31/89: $525,000,000*
Noncaptive Revenue: $500,000,000*
*INPUT estimate

The Company

GE Information Services (GEIS) provides transaction and utility processing; inquiry/response, electronic data interchange, and value-added network services; systems integration; and software development and network management professional services to over 10,000 clients worldwide. Its focused industries include international banking and financial services, international trade and transportation, retail/apparel/merchandising, telecommunications, automotive/heavy equipment/manufacturing, petroleum/chemical, and high technology.

EDI Offering

Transmission Services

The EDI*EXPRESS™ System, introduced in November 1985, provides the capabilities for sending, receiving, translating, and compliance checking of EDI messages. The system also provides document and/or interchange level auditing and reporting to the user for tracking and monitoring system usage.

- Two levels of service are available. The Interchange Level Service, announced in December 1989, enables customers to select a level of service commensurate with the requirements of their applications. The service performs control verification and provides tracking reports for interchanges. The Document Level Service, available since 1987, offers network control verification and tracking at both the interchange and document levels.

- EPS*EXPRESS™ Service, introduced in January 1990, permits EDI*EXPRESS clients to initiate electronic payments to their vendors.

UPC*EXPRESS Catalog is a service that manages and distributes Universal Product Code (UPC) numbers and their description information for vendors and their retailers. This data base of UPC information is integrated with the EDI*EXPRESS System so that vendors and retailers can use EDI to electronically maintain and receive UPC catalog updates.

Software

The EDI*PC™ System, introduced in November 1985, is a software package for IBM and compatible microcomputers that allows trading partners to send and receive EDI documents and status reports in a standard format to and from the EDI*EXPRESS System. It can be used as a workstation or as a front-end to an in-house computer for translation. The software licenses for $1,450.

The EDI*CENTRAL™ System, introduced in July 1988, is a mainframe software package supporting COBOL 74 for mainframe EDI gateways supporting multiple distributed business applications. It allows the client to send EDI data to and from its in-house application system and provides EDI translation between application data and EDI standard formats. The system licenses for $20,000 for the first copy, with additional copies per company at $12,000 each. The annual subscription service fee is $2,400 after the first year.

The DESIGN*EXPRESS™ System is a family of products that allows engineering/manufacturing design data to be processed and transmitted electronically in several types of document formats. DESIGN*EXPRESS products became commercially available in the U.S. in 1989.

GEIS offers to its EDI clients, network services, mainframe and PC translation software, trading partner educational conferences, training and documentation services, and ongoing hotline support for EDI services via a toll free telephone number.

- GEIS has designated Microdynamics (Dallas) as a Value-Added Service Provider for DESIGN*EXPRESS to the sewn-goods industry.

- In February 1989, GEIS announced an alliance with International TechneGroup Inc. (ITI) whereby ITI will provide CAD translation software and consulting services to users of GEIS' DESIGN*EXPRESS services.

Consulting and Education

GEIS provides on a fee-basis, the following services to the EDI client:

* Technical training course on standards conducted on the customer site for a maximum of one day. GE provides the instructor and all suitable student materials including several mapping exercises between a private format and a common standard.

* Standard dial-out implementation consisting of (1) initiaion of EDI*Express dial out service to a custoemr or other third-party network, (2) communicatins test for a computer system not previously accessed via dial-out, and (3) completion of the EDI*Express systems administration function for the third party.

* EDI*T (software) installation assistance consisting of a maximum of two days on-site. A GEIS representative will assist the customer with (1) loading EDI*T software modules from tape, (2) compiling software modules, and (3) executing test procedures to ensure EDI*T was properly installed. Mapping procedures are provided at an extra cost.

* Private format implementation consisting of modifying the EDI*Express system to perform mailbox and other functions for non-public document standards.

* Applications intergarion consulting considting of on-site technical assistance on integratin the EDI*T system with the customer's in-house private format by mapping the customer's private format to an EDI standard flat file used by the EDI* T system.

* EDI*PC installation assistance consisting of a maximum of one day on site. A GEIS representative will assist the customer with loading the softwaer on to the personal computer hard disk, establishing communicateins with the GE nework, and performing the EDI*Express system administration function with the customer.

Also, GEIS provides "EDI Implementation Services" designed to help a large corporation bring up its trading partners on EDI.

Related Network Services

GE Financial Information Services, a unit of GEIS formed in 1989, supports international network applications for banking and financial institutions.

GEIS offers a family of products for office communications and automation linking geographically dispersed operations via its worldwide teleprocessing network.

The BusinessTalk™ System is an intelligent communications capability combining the functions of textual data bases with a key word search, bulletin boards, electronic mail, and graphics.

The QUIK-COMM™ System is a global electronic mailbox service The system provides its users with the option of converting their E-mail messages into fax, telex, or hardcopy postal deliveries. Also, the system can interface with private message networks running on IBM PROFS, DISOSS, DEC All-In-1, Wang OFFICE, Retix Messaging System (IBM AS/400 or System/3x), 3+Mail LAN System, or CC:Mail LAN Systems.

In October 1989, GEIS announced the commercial availability in the U.S. of X.400 standard access to the QUIK-COMM family of products. In February 1990, GEIS announced an X.400 interconnect to Western Union's EasyLink electronic messaging service.

The MARK*NET Service is a value-added network service offered to clients in the U.S. and Canada through direct access, based on the GEIS Network and local support services in both countries.

A MARK*NET client who has users outside of North America typically accesses the service via Public Data Network (PDN) access in the local country, interconnected to MARK*NET via International Record Carrier (IRC) gateways. GEIS provides international access to MARK*NET in this manner from approximately 70 countries.

MARK*NET Service has all the technical functionality inherent in the GEIS network, including multiple protocol support, protocol conversion services, error correcting protocols, full network redundancy, a security administration and control system, and on-line monitoring capabilities.

Access nodes include dedicated leased line access, private dial access, and public dial access.

Managed Network Services (MNS), introduced in 1987, is a specialized teleprocessing service that provides client organizations with custom-tailored network and session management of their international information and communications systems.

GEnie™ (GE Network for Information Exchange) is an electronic consumer information service for microcomputer end users. GEnie permits access to a variety of services, including news and information, financial, travel, shopping, computer games and references, electronic mail, and real-time conferences.

Customer Base

User Characteristics

GEIS' EDI services are used by clients in the trade and transportation, manufacturing, and retail industries. GEIS' EDI network currently connects more than 6,000 trading partners worldwide.

GEIS' 1989 revenue was derived approximately as follows:

Banking	40%
Manufacturing	32%
Telecommunications	10%
Transportation	10%
Retail	5%
Other	3%
	100%

GEIS currently has a client base of over 10,000 corporations and trade associations.

Approximately 50% of GEIS's 1989 revenue was derived from the U.S. and 50% from international sources.

Key Customers

U.S. Federal Government's General Services Administration/Federal Supply Service (the buying body of the federal government), Sea-Land Service Inc., Electronic Data Systems (European network services), Baster Travenol, CEFIC (European Council of Chemical Manufacturers' Federations), Port Authority of New York and New Jersey are some of GEIS' largest accounts.

GEIS also supports several private and industry association networks, including Catspeed (Caterpillar Tractor Company's private EDI implementation), Haggar Apparel Company's HOP (Haggar Order Processing), LeviLink (Levi-Strauss), PetroEx (the Petroleum Data Exchange System), The Poand Transnet (operated by the Motor Equipment Manufacturers Association, Englewood Cliffs, NJ).

Market

Market Share

INPUT estimates that GEIS receives approximately $22 million in revenues from EDI network services, or 25% of the EDI network services market. It is the leader in network services.

INPUT estimates that GEIS receives $5 million in EDI software sales and support services, or 10% of the software market. This dollar volume makes it tied with Supply Tech in the software market for the number two position. (Number one in software is Sterling Software/Ordernet.)

Sales and Service Locations

GEIS products and services are offered through approximately 50 U.S. offices and offices in 34 countries, with global support and access provided by distributors, affiliates, or private data networks in 60 additional countries.

U.S. regional offices are located in New York City, Atlanta, Chicago, and San Francisco.

International offices are located in Australia, Austria, Belgium, Canada, France, Germany, Hong Kong, Ireland, Italy, The Netherlands, Norway, Singapore, Spain, Sweden, Switzerland, and the U.K.

GEIS's network provides clients with local dial-up services in 750 cities in more than 30 countries worldwide and is available 24 hours a day, seven days a week, 365 days a year. Coverage is extended to more than 90 countries by interconnections with public data networks and international record carriers.

An EDI hotline (telephone service) is available 24-hours per day, everyday. Inside the United States, it is toll-free.

User Start Up Procedures

GEIS sends software. Customer tests logging onto network. Customer tests sending data to trading partner.

Liability for Lost Data

Unavailable.

Pricing

(effective December, 26, 1989)

For sending or receiving EDI messages, the user can choose between being billed on the document level or the interchange level (an interchange may contain many documents).

Interchange level: $.18 per interchange, plus $.015 per 100 characters up to 40 kilocharacters, plus $.01 per 100 characters over 40 kilocharacters.

Document level: $.14 per document, plus $.02 per 100 characters up to 40 kilocharacters, plus .015 per 100 characters over 40 kilocharacters.

For other service pricing, see product literature.

Technology

Network Configuration

The GEIS Network is the company's worldwide teleprocessing network based on a proprietary packet-switching protocol. It permits multisite organizations to achieve data transmission to dispersed terminals and host computers around the world with approximately 600 access points in the U.S. and in-country direct access in 35 countries.

Large-scale IBM and Honeywell processors are concentrated in supercenters in Rockville, MD, Cleveland, OH, and Amstelveen, The Netherlands. GEIS is considering opening a fourth supercenter in Italy.

Interconnection Arrangements

The GEIS network is interconnected with all the major VANs in the United States. It uses primarily the 3780 protocol to inteconnect. X.400 is not used yet except with AT&T's Accunet, but very little traffic passes between these two networks.

Protocols Supported

The GEIS network supports asynchronous, IBM-compatible synchronous (including 3270 BSC, 3270 SNA/SDLC, 2780/3780 BSC, 3770 SNA), and X.25 protocols.

In addition to supporting SNI interconnections among SNA networks, it offers a variety of error-correcting protocols, such as MNP and XMODEM, and it provides 3270 emulation via NET*CONNECT 3270 and Simware's SIM 3278, SIMPC, and MAC3270.

Protocol Support Plans

GEIS has made no announcement concerning new protocols to support.

EDI Formats Supported

GEIS supports all standard formats including ANSI X12, TDCC, WINS, UCS, EDIFACT as well as many proprietary formats (most of which GEIS invented -- Petrodex, Pubnet, Transnet, etc.)

Data Format Translation

GEIS offers on-network translation between all major and proprietary EDI data formats.

EDI and ISDN

Not available.

Sources of Technology

Third party hardware vendors. Software developed in house.

Switching Systems

The GEIS network uses over 6,000 processing and communications computers, including over 500 minicomputers. Over 400 of these are Honeywell PMSDs, used to handle communications. Large-scale IBM and Honeywell processors are concentrated in supercenters in Rockville, Cleveland, and Amstelveen. These consist of:

Fourteen Honeywell DPS 90/ACOS 1000s and seven Honeywell DPS-8/70s operating under GEIS proprietary software for interactive processing, and 15 Honeywell DPS-8/70s running under GCOS for background remote batch processing.

One IBM 3081, one IBM 3090, and one IBM 4341 for interactive and remote batch processing on the MARK 3000 Service.

GEIS's teleprocessing network handles over 400,000 user sessions per day, transmitting over 300 million characters of data in and out of the system per hour.

The network consists of VSAT satellite links, microwave links, undersea cables, and 350,000 miles of circuits.

Strategies and Alliances

GEIS's strategy is to maintain its leadership role in EDI in the US and throughout the world. Its targetted industries are retail, grocery, trade and transportation, automotive, oil, chemicals.

The cornerstone of GE's strategy is alliance building, with joint marketing agreements and agent relationships. It has worked with industry groups to win endorsements for its EDI services.

GEIS has EDI-related alliances with various third parties to sell its services along with their software and equipment.The company currently has agreements with:

- ACS Network Systems (Concord, CA) for sales to the apparel industry.
- American Business Computer (Farmington Hills, MI) for the automotive industry.

- Can/Am Tech (Hamilton, Ontario) for sales and support in the metals industry.

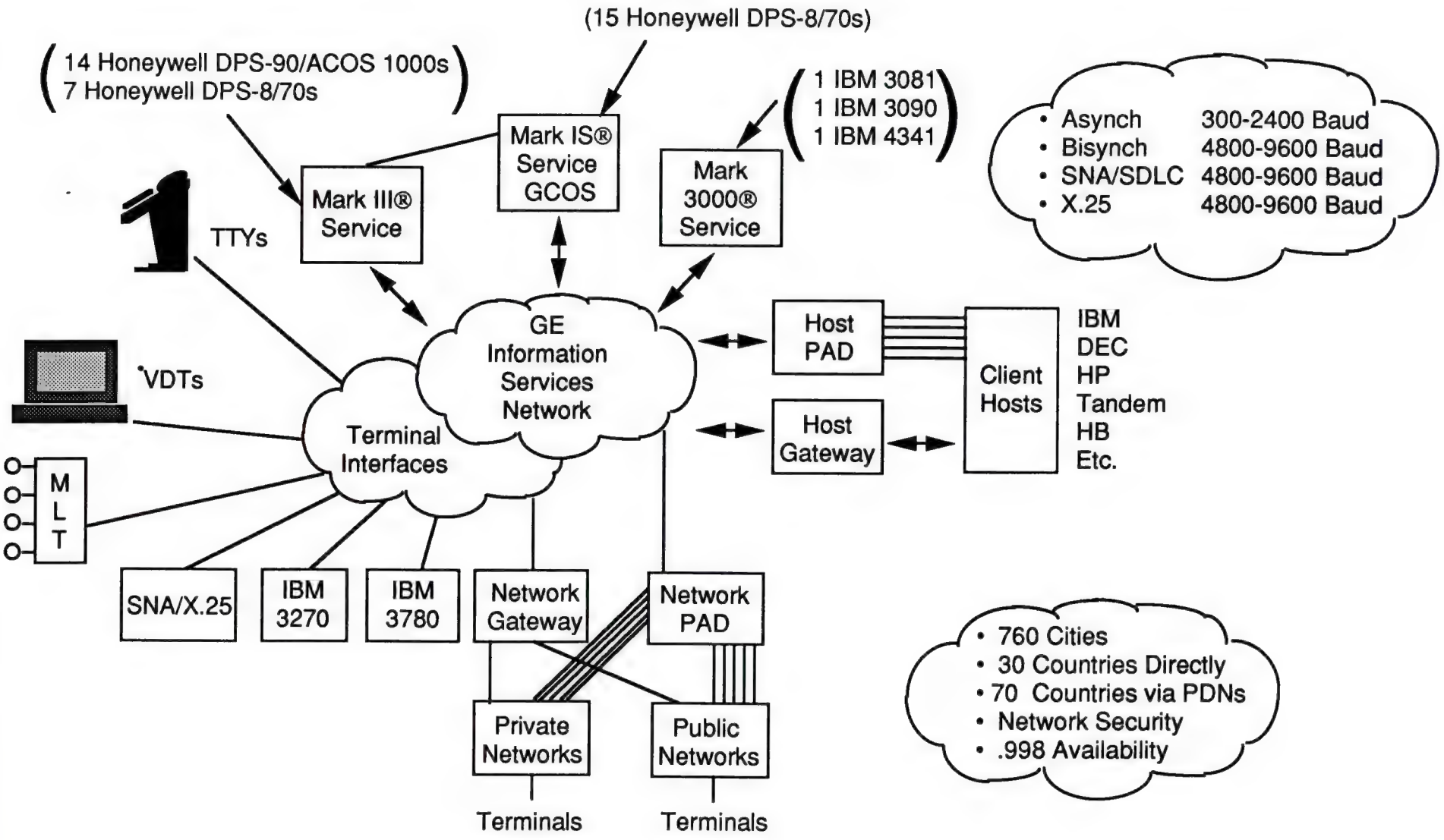
- McCormack & Dodge (Natick, MA) for software integration.

- Microdynamics (Dallas, TX) for DESIGN*EXPRESS to the sewn-goods and apparel industry.

- Management Science America (Atlanta, GA) for general joint marketing.

- Supply-Tech (Southfield, MI) for sales to the automotive industry.

GE Information Services Network Architecture



U. S. Price Schedule for Worldwide Electronic Data Interchange Software and Services

Featuring:

The EDI*EXPRESS™ System
The EDI*PC™ System Software
The EDI*T™ System Translator Software
The EDI*CENTRAL™ System Translator Software
DSXMIT™ Communications Software
Implementation Professional Services

EFFECTIVE DECEMBER 26, 1989

GE Information Services

5070.17B (10M) 8943
Printed in U.S.A

Effective December 26, 1989

EDI*EXPRESS™ Service Price Schedule

Basic Service Charges

System Activity	Unit of Measurement	Peak Time Price*
SEND OR RECEIVE ACCORDING TO SERVICE LEVEL		
(a) Interchange Level Service	per Interchange(a)	$0.18
	plus per 100 characters, up to 40KC(b)	$0.015
	" " " " , over 40KC(b)	$0.01
OR		
(b) Document Level Service	per Document(c)	$0.14
	plus per 100 Characters, up to 40KC(b)	$0.02
	" " " " , over 40KC(b)	$0.015
MANAGEMENT REPORTS(d)	per 100 Report Characters(d)	$0.01
	or per Printed Page(e)	$0.50
SESSION	per Session(f)	$0.20

Non-System Activity Charges	Unit of Measurement	Price*
SERVICE INITIATION(g)	per User Number	$300.00
SERVICE INVOICE MINIMUM(h)		
with two-year commitment	per Invoice	$ 50.00
with 30-day commitment	per Invoice	$100.00
MONTHLY MAILBOX FEE	per User Number Per Month	$40.00

Discounts for Service Accessed in U.S.

OFF-PEAK USAGE DISCOUNT (i)		25%
MONTHLY VOLUME DISCOUNT (j)		
First tier	$ 1,000.01 - $ 4,000.00	10%
Second tier	$ 4,000.01 - $ 8,000.00	20%
Third tier	$ 8,000.01 - $15,000.00	30%
Fourth tier	$15,000.01 - $25,000.00	35%
Fifth tier	$25,000.01 - $50,000.00	40%
Sixth tier	$50,000.01+	45%

* GE Information Services' monthly invoice will be stated in units of ABU's, where 1 ABU = $0.01. Each System Activity charge is computed on a transaction by transaction basis as it occurs. After a System Activity charge is computed, it is rounded up to the nearest whole ABU.

Effective December 26, 1989

EDI*EXPRESS™ Service Price Schedule

Optional Service Charges

System Activity	Unit of Measurement	Peak Time Price*
Document Translation(k)	per 100 Characters	$0.06
Envelope-only Translation(l)	per Envelope	$0.05
Multiple Document Distribution**	per Document - Interchange Copy Send(m)	50% discount
Compliance Check(n)	per 100 Characters	$0.03
Dial-Out Service(o)	per 100 Characters	$0.01
Express Dial-Out Service(p)	per 100 Characters	$0.015
Express Mailbox Service(q)	Transaction Premium	30%
Trading Partner Pair Administration(r) (New, change, display, etc.)	per trading partner	$0.50

Non-System Activity Charges	Unit of Measurement	Price*
In-WATS (800 Service) Access Surcharge(s)	per minute of connect time	$0.3333
Document Storage(t)	per 100 Characters per day (beginning day 4)	$0.0004
Status Report Data Retention(t)	per Document per day (beginning day 8)	$0.0004
Dedicated Port access to EDI*EXPRESS(u)	per month	$700.00
Third Party Public Network Connection(v)	per connection per month	$25.00

** Unavailable at the present time. Consult your GE Information Services representative for estimated availability.

Additional System Activity Charges for International Transactions

	Unit of Measurement	Premium
Between Zones(w)	per 100 characters	70%

* GE Information Services' monthly invoice will be stated in units of ABU's, where 1 ABU = $0.01. Each System Activity charge is computed on a transaction by transaction basis as it occurs. After a System Activity charge is computed, it is rounded up to the nearest whole ABU.

Effective December 26, 1989

EDI Software and Services

Software License Fees(x)

PC SOFTWARE

EDI*PC System workstation software. Initial Program License Fee per copy • 100% credit toward license of EDI*T or Central	$ 1450.00
EDI*PC System Annual Program License Fee per copy per year, after year 1	$ 180.00

MAINFRAME SOFTWARE

EDI*T System translator software. Program License Fee per copy	$9,500.00
EDI*T System, Annual Subscription Services Fee per copy, after year 1	$1,200.00
EDI*CENTRAL™ System software, including the Translator Interface and Print Programs. License Fees:	
First copy	$20,000.00
Second and each Additional copy	$12,000.00
EDI*CENTRAL System, including the Translator Interface and Print Programs. Annual Subscription Services Fee, after year 1:	
Per copy	$2,400.00
Translator Interface and Print Programs only. License Fee:	
Per License	$4,000.00
Translator Interface and Print Programs only. Annual Subscription Services Fees, after year 1:	
Per License	$ 800.00

COMMUNICATIONS SOFTWARE

DSXMIT System, DOS and OS versions. License Fees:	
• First Copy	$ 900.00
• Second and each Additional Copy	$ 500.00
DSXMIT System Annual Subscription Fee per copy, after year 1	$ 180.00

Note: All software requires separate Program License Agreement.

Professional Services Charges(y)

EDI*T and EDI*CENTRAL installation assistance:	
• Up to 2 person-days and expenses	$ 1,800.00
• Additional days, if required, including expenses	$ 750.00
• Applications integration technical assistance, if required, is additional	
Private format implementation	Quoted on a time and material basis. $600 per day, $5,000 minimum
Applications integration consultation	Consultation provided is based on published Professional Services rates
On-site trading partner implementation of EDI*PC, per trading partner, including end-to-end communications test	$ 500.00

Or

A Package of Implementation Services:	Quote
One-day technical training class on document standards conducted on customer site	$1,250.00
Standard Dial-Out implementation, including end-to-end communications test, per GE specification:	
• Initiation of Dial Out service	$ 250.00
• Communications Certification for new connection	$ 300.00
• Administration of non-customer trading partner, e.g., modify a trading partnership	$ 25.00
Non-standard Dial-Out implementation, including end-to-end communications test	Quoted on a time and material basis. $600 per day, $1,500 minimum

If your implementation needs are more complex than can be satisfied by the above services, please consult your GE Information Services Representative. Your Representative can tailor a package of implementation services for a *fixed price* that will meet your exact needs.

(a) An INTERCHANGE is a specific group of data segments that represent a common business envelope as defined by the EDI standard being used. Public EDI standards, such as ANSI X12 or EDIFACT, refer to an interchange as such. For billing purposes, an interchange includes all data segments between the beginning and end of the interchange (such as, ANSI ISA through IEA segments). Interchanges incur a charge per interchange plus a variable charge per 100 characters contained between the interchange start and end segments.

(b) ONE HUNDRED DOCUMENT CHARACTERS (100 characters) is the unit of measurement for documents. Document characters include the characters for interchange envelopes, functional group envelopes, and document envelopes. INTERCHANGE characters include all of the characters in and between the start segments of the interchange. The hundred character units are rounded up to the next unit.

(c) A DOCUMENT is a specific group of data segments that represent a common business document as defined by the EDI standard being used. Public EDI standards, such as ANSI X12 or EDIFACT, refer to a document as a Transaction Set or Message. For billing purposes, a document also includes all leading data segments (such as the ANSI ISA, GS, and ST segments) that immediately precede a document as well as all trailing data segments (such as the ANSI IEA, GE, and SE segments) that immediately follow a document. Documents incur a charge per document plus a variable charge per 100 characters, including characters contained in the leading and trailing data segments.

(d) MANAGEMENT REPORT charges depend on whether printed or electronic format reports are selected by the customer. The first copy of the Billing Summary Report and List of EDI Trading Partners Report is free each month; copies in excess of one per month are charged at the per-Printed Page rate or per 100 Characters. All other Management Reports are charged beginning with the first copy.

ONE HUNDRED REPORT CHARACTERS (100 characters) is the unit of measurement for electronic format management reports. Report characters are received unformatted to allow the customer to format its own reports. The hundred character units are rounded up to the next unit.

(e) A PRINTED PAGE for reports is defined as a numbered report page as illustrated in the EDI*EXPRESS System documentation.

(f) SESSION is defined as the period beginning each time a customer accesses the EDI*EXPRESS System to perform any System Activity and ending upon termination of access to the EDI*EXPRESS System. SESSION Charges will also apply to Sessions initiated via Dial-Out service or Express Dial-Out service.

(g) A charge for SERVICE INITIATION will apply upon validation of a User Number to access the EDI*EXPRESS System. SERVICE INITIATION results in the mailing of the EDI*EXPRESS User Documentation at no additional charge.

(h) The MONTHLY SERVICE INVOICE MINIMUM applies to EDI*EXPRESS System use only and can include, at the customer's option if billed to a single invoice, usage from multiple EDI*EXPRESS System User Numbers including the EDI QUIK-COMM™ System. The MONTHLY SERVICE INVOICE MINIMUM will apply each month while service is in effect even if the EDI*EXPRESS System is not used during the month.

(i) A 25% OFF-PEAK DISCOUNT will be applicable to charges generated by any of the System Activities when these Activities are generated during a session which was initiated during Off-Peak hours. Off-Peak hours are, within North America, all hours from 8:00 p.m. to 8:00 a.m., Local Standard or Daylight Savings time, whichever is in effect, Monday through Friday, and all day on Saturday, Sunday and the following legal U.S. public holidays as established by 5 U.S.C. Sec 6103(a): New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, and Christmas Day. Non-U.S., Off-Peak is 8:00 p.m. to 8.00 a.m., local time for the country in which the user is validated, and applies Monday through Friday, and all day on Saturday and Sunday (OFF-PEAK is also known as Non-Prime).

(j) MONTHLY VOLUME DISCOUNTS work as follows:

- The customer will receive a 10 percent discount on all charges between $1,000.01 and $4,000.00 billed to it for System Activities accessed in the U.S. each month (after all Off-Peak and Multiple-Document discounts have been applied).

- The customer will receive a 20 percent discount on all charges between $4,000.01 and $8,000.00 billed to it for System Activities accessed in the U.S. each month (after all Off-Peak discounts, Multiple-Document discounts have been applied).

- Additional usage during a month will have the appropriate discount applied in turn in the above manner, according to the applicable volume tier.

VOLUME DISCOUNTS apply only to charges for System Activities and do not apply to charges for other services such as Initiation of Service, Monthly Mailbox Fee, Dedicated Port Access, Third Part Network Connection Fee, Licensed Software, and Professional Services.

(k) DOCUMENT TRANSLATION is charged for those documents which the customer requests the EDI*EXPRESS System to translate.

(l) ENVELOPE-ONLY TRANSLATION is translation of a document Envelope from one envelope format to another, such as ICS to BG, BG to ICS, ISA to ICS, ICS to ISA, BG to ISA, and ISA to BG. Consult your GE Information Services representative for availability.

(m) A DOCUMENT or INTERCHANGE COPY is a duplicate copy sent in a single transmission to a different mailbox than the mailbox to which the original Document Interchange is sent. The Multiple Document Distribution discount applies to the Send Document-Interchange charge for each Copy. This discount does not apply to the Receive charge. Multiple Document Distribution is not available at the time of this printing. Consult your GE Information Services representative for availability (estimated late 1990).

(n) COMPLIANCE CHECK is charged for those documents on which the customer requests the EDI*EXPRESS System to perform a compliance check against a public or private standard.

(o) DIAL-OUT Service charges are in addition to the charges resulting from System Activities and are incurred when such activities are initiated via DIAL-OUT service. Character counts are rounded up to the next 100 characters.

(p) EXPRESS DIAL-OUT charges are in addition to charges resulting from System Activities and are incurred when such activities are initiated via Express Dial-Out service. These charges are billed to the requester. Character counts are rounded up to the next 100 characters.

(q) EXPRESS MAILBOX Service allows a document to be routed for retrieval by the intended recipient on a high priority basis. The Express Mailbox TRANSACTION PREMIUM applies to Send Document charges only. It is calculated prior to any Off-Peak or Volume Discounts.

(r) TRADING PARTNER PAIR ADMINISTRATION is charged for all maintenance activity to add, change, display, etc., the parameters of document exchange for a trading partner pair relationship.

(s) IN-WATS (800 Service) ACCESS Service surcharge is charged on the basis of Terminal Connect Time (TCH) as defined in the Teleprocessing Services Price Schedule. Off-Peak discounts do not apply to IN-WATS ACCESS charges. IN-WATS ACCESS Service is also known as Extended National Access Service.

(t) No charge will be made for DOCUMENT STORAGE for the first three (3) days of storage. A charge for storage begins after day three, including weekends and holidays. No charge will be made for STATUS DATA for the first seven (7) days of storage. A charge for storage begins after day seven, including weekends and holidays.

(u) DEDICATED PORT ACCESS is a charge in addition to all other EDI*EXPRESS System charges. The customer executes a separate agreement for this service which entitles the customer to a dedicated communications port on the GE network. The customer pays for the modems, and the leased line portion of the cost to the selected leased line carrier.

(v) This fee will apply to each connection made to a third party public network on behalf of an EDI*EXPRESS Client whose Trading Partners use EDI services provided by a third party. This charge is in lieu of the initiation of Dial Out and Communications Certification Charges for Standard Dial-Out Implementation Service.

(w) The NORTH AMERICA ZONE is defined as Canada, Mexico and the U.S. The EUROPE ZONE is defined as the countries within the continent of Europe plus the United Kingdom and Republic of Ireland, Denmark, Norway, Sweden and Finland. The MIDDLE EAST ZONE includes Saudi Arabia. The Northern PACIFIC ZONE includes the countries of Republic of China, Hong Kong, Japan, Republic of Korea, Malaysia, Philippines, and Singapore. Other areas may be added later. The AFRICAN ZONE includes Egypt. The SOUTHERN PACIFIC ZONE includes Australia, New Zealand. The CENTRAL and SOUTH AMERICAN ZONES includes all countries south of Mexico. BETWEEN ZONES is defined as use by trading partners accessing the EDI*EXPRESS System in different zones.

(x) SOFTWARE LICENSE agreements are required to be signed for software for use on the customer's computer.

When an EDI*PC™ System licensee licenses the EDI*CENTRAL System, the Initial Program License Fee **paid*** for each copy of the EDI*PC System will be credited toward each License Fee of the EDI*CENTRAL System, provided however that the EDI*PC System licensee will not be eligible for credit if this credit has already been given by virtue of being a pre-existing EDI*T™ System licensee.

When an EDI*T System licensee licenses the EDI*CENTRAL System, the Program License Fee **paid*** for only one copy of the EDI*T System will be credited toward the License Fee of the EDI*CENTRAL System, provided however that the EDI*T System licensee terminates the EDI*T System License Agreement for such copy by either (a) returning such copy of the EDI*T software and all copies thereof (including all documentation and materials provided by GE) to GE Information Services within 90 days of the date of the EDI*CENTRAL System License Agreement execution or (b)destroying such copy of the EDI*T software and all copies thereof (including all documentation and materials provided by GE) and certifying the destruction to GE Information Services in writing within 90 days of the date of the execution of the EDI*CENTRAL System License Agreement. After the EDI*T System license for such copy is terminated, the credit will be given.

When a Translator Interface and Print Program licensee licenses the EDI*CENTRAL System, the Translator Interface and Print Program License Fee **paid*** will be credited toward the License Fee of the EDI*CENTRAL System, provided however that the Translator Interface and Print Program licensee terminates the Translator Interface and Print Program License Agreement by sending a written notice to GE Information Services within 90 days of the date of the execution of the EDI*CENTRAL System License Agreement requesting the termination of the Translator and Interface Program License Agreement.

(y) PROFESSIONAL SERVICES charges are payable when services are provided to the customer, with the exception of the Package of Implementation Services which is payable in advance of services provided. PROFESSIONAL SERVICES consist of:

- TECHNICAL TRAINING COURSE ON STANDARDS conducted on the customer site (or site of customer preference) for a maximum of one day. GE will provide the instructor and all suitable student materials including several mapping exercises between a private format and a common standard. All travel and living expense are included.

- STANDARD DIAL-OUT IMPLEMENTATION consisting of: 1) initiation of EDI*EXPRESS Dial-Out service to a customer or other third-party network, 2) communications test for a computer system not previously accessed via Dial-Out, and 3) completion of the EDI*EXPRESS System Administration function for the third party. NON-STANDARD DIAL-OUT IMPLEMENTATION charges apply when customer communications protocol does not conform to standards described in the High Speed Service documentation.

- EDI*T INSTALLATION ASSISTANCE consisting of a maximum of two days on-site technical assistance with the installation of EDI*T. The GE technical representative will assist the customer with: 1) loading EDI*T software modules from tape, 2) compiling software modules, and 3) executing test procedures to ensure EDI*T was properly installed. This service does not include EDI Standards consulting to "map" the customer's private format to an EDI public standard or programming services.

- PRIVATE FORMAT IMPLEMENTATION consisting of modifying the EDI*EXPRESS System to perform mailbox and other functions for non-public document standards.

- APPLICATIONS INTEGRATION CONSULTING consisting of on-site technical assistance on integrating the EDI*T System with the customer's in-house private format by mapping the customer's private format to an EDI Standard Flat File used by the EDI*T System.

- EDI*PC INSTALLATION ASSISTANCE consisting of a maximum of one day of on-site technical assistance with the installation of EDI*PC. The GE technical representative will assist the customer with loading the software on to the personal computer hard disk, establishing communications with the GE network, and performing the EDI*EXPRESS System Administration function with the customer. The customer is responsible for providing appropriate hardware and arranging for a telephone line prior to arrival of the GE Information Services technical representative.

* The credit to be applied in any situation in which the software program which is the basis of the credit was acquired as part of a bundled implementation package will be the lesser of (1) the list price license fee for such software package existing at the time the implementation package agreement was executed, or (2) one-half of the implementation package fee paid.

TELENET COMMUNICATIONS CORPORATION
12490 Sunrise Valley Drive
Reston, Virginia 22096
(800) TELENET
(703) 689-7223

EDI Contacts: Michael Mansouri, James Roberts

The Company

Telenet is part of U.S. Sprint, which itself is owned jointly by GTE and United Telecommunications Inc. Sprint is the third largest long distance telephone carrier in the U.S. Telenet is an International Record Carrier and the largest data communications network in the U.S. and the world.

United Telecommunications (currently owning 80.1% of U.S.Sprint) intends to buy out GTE's portion of Sprint. Pending the buyout (which looks certain to go through by the end of 1990), Telenet will be consolidated into Sprint. The data network will be renamed "SprintNet" in the U.S. but will keep "Telenet" with international customers.

This profile will use the name Telenet.

EDI Offering

Network Transmission

Telenet is private labelling and reselling the EDI processing/store-and-forward services of Sterling Software's Ordernet. (Sterling is headquartered in Dallas, Texas, the Ordernet division is based Columbus, Ohio.)

Telenet EDI customers send EDI messages to the Telenet network. Telenet routes them to Ordernet for processing.

EDI Data Formats Supported

ANSI X12, UCS, and TDCC. Also, on-network translation services are provided. Documents can be translated to multiple EDI standards.

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Software

Telenet markets EDI translation software (that runs on the user's host) from third parties (see Alliances below).

Also, Telenet produces a "purchasing scripts software" package which enables customers to transact business via Telenet's E-mail service in EDI mode. Companies without EDI capabilities are enabled to trade with EDI-capable companies.

Consulting and Education

Telenet provides consulting to users in the form of: needs assessment, education, and operations and implementation consulting.

It offers a Trading Partner Implementation Program which helps a single company bring up its trading partners with EDI.

Telenet has a 24-hour "help desk" for customer support in EDI.

Telenet has 30 customer support offices in the U.S.

Sales and Service Locations

The company maintains approximately 50 sales and support offices in the U.S. It has offices in Tokyo and London abroad and intends to open more in the near future.

User Start-Up Procedures

Varies by individual case.

Other Network Services

Telenet operates the world's largest public data network and is a leading supplier worldwide of private data networks. Telenet has developed and installed more than 120 private networks, many of which are used for national public data networks operated by the local PTT authority.

Telenet provides Telemail electronic messaging service, which operates via the Telenet public data network. There are approximately, 200,000 Telemail users around the world.

Telenet also provides access to on-line commercial data bases.

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Customer Base

User Characteristics

Telenet is aiming its EDI offering to Fortune 500 companies and its large accounts who require EDI capability.

Its customers are broad based, however, large accounts include companies in apparel, telecommunications, electronics, retail, and the fast-food industries.

Key Users

Currently, it has only 40-50 EDI customers. Two large contracts in 1990, however, promise to bring approximately 500 more companies onto the network who will conduct EDI.

Marketing

Market Share

INPUT estimates Telenet's market share in EDI network services to be 1.5%.

Perception of Competitors

Telenet differentiates itself from other EDI networks in that it is provides a wider offering of public data network services.

Profit Centers

INPUT estimates that Telenet's revenues from its EDI services amounted to $1.2 million in 1989. These largely derive from its network charges, not software or professional services. Because Telenet uses a third-party EDI service bureau to process transmissions and because its EDI business is so negligible, INPUT believes that Telenet's EDI business is not profitable.

Liability for Lost Data

Telenet is not responsible for consequential damages resulting from losing a customer's data. It will waive network charges only in the event of losing data.

Pricing

Telenet's charges vary according to customer linkage to its network (leased line or dial up), protocol used, and speed of data transmission. Also, transmissions outside of the continental United States vary according to destination.

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93

Generally, for network usage in the continental U.S.:

- Using a dedicated line to reach the Telenet network, the client pays: a one-time installation charge (ranging from $1,200 to $9,600), and a monthly charge (ranging from $600 to $2,800).

- Using dial-up service (client calls a Telenet Access Center via the local telephone network), the client pays: from $6.00 to $14.00 per hour of access time.

For complete price options, see associated rate schedule.

Technology

Equipment and Systems

U.S. Sprint's Mt. Laurel, NJ facility manufacturers a series of processors that are used as switching devices in its network.

Network Configuration

North America: Telenet maintains 490 local Access Centers, or network nodes, into which customers can dial into the network.

In addition, Telenet has approximately 50 Central Offices which provide network concentration and switching.

Worldwide: SprintNet/Telenet maintains 72 international access locations.

Internetworking Arrangements

Internetworking is a large component of Telenet's strategy.

North America: Telenet has interconnected with the following eight U.S. E-mail services: AT&T Mail, Dialcom (BT Tymnet), GE Information Services Quickcomm, IBM Information Network Screen Mail, MCI Mail, BT Tymnet OnTyme, and Western Union 400.

Worldwide: Telenet has built 20 turnkey E-mail networks abroad, many of which for national PTTs.

Volume/Capacity

All data communication over Telenet (EDI, E-mail, and other data communication) totals nearly 50 million data calls and four billion packets per month. This is 50 percent of Telenet's peak-hour capacity.

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Protocols Supported

For EDI applications, Telenet supports asynchronous, X.25, 3270, SDLC, 2780/3780, and applications running custom protocols simultaneously on one network.

Protocol Support Plans

Telenet's Telemail network incorporates the X.400 interconnect standard. The X.400 is used to connect private and public E-mail systems. Telenet does not yet endorse the wrapping of EDI messages with an X.400 envelope but will do so when market conditions are right.

Protocol Conversions

Despite the protocol a customer uses to connect with the network, inside the network messages are routed using an X.25 protocol. The teleprocessor that handshakes with the sender wraps the incoming message with the X.25. The exit teleprocessor unwraps it.

Telenet sends all EDI traffic to Ordernet. The Ordernet host receives messages in the 3780 protocol.

EDI and ISDN

Telenet maintains a fiber-optic backbone to its North American portion of the network and is a partner in transatlantic and transpacific fiber-optic cable consortia.

Telenet has promised to make a "clear migration path" to ISDN, fast packet, and future network technologies.

Sources of Technology

Sprint makes some of the switching equipment in its network. It purchases some as well from Northern Telecom, AT&T, and Norse Supply (a sister company to Sprint) among others. It purchases all its cabling from the outside.

Switching Systems

Hardware: Telenet uses its own TP3 and TP4 switches/intelligent multiplexors.

Software: Developed by Telenet.

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Data Format Translation

All EDI messaging is routed through Sterling Software Ordernet. Ordernet provides on-network translation among standard and proprietary formats.

Strategies

Sprint International's EDI strategy is focused on marketing services to Fortune-500 companies, many of whom already use U.S. Sprint's long distance (voice) services. The company is concentrating on a small community of huge enterprises, rather than going after a huge community of small enterprises. Each large customer brings hundreds of trading partners to Sprint as new customers.

Also, paralleling the company's larger VAN strategy, Sprint International is positioning itself as a provider of international EDI connectivity, allowing its customers to conduct EDI across borders. Thus, it is pursuing multinational and network services.

Already, Sprint International maintains 72 access centers to its network abroad. It is a partner in the transatlantic and transpacific fiber-optic cable systems.

An International Value-Added Network group within Sprint International intends to open sales and service offices around the world.

Interconnection with other networks, public and private, is a key component of Sprint International's service strategy.

- In 1989, Telenet's Telemail service became interconnected with eight other major E-mail services in the U.S.

- It has embraced the X.400 message-handling standard as a means of interconnecting disparate systems, including the internal messaging systems of large corporations.

- It has also licensed its E-mail switch software to 20 international PTTs and service providers, facilitating international linkages.

Abroad, Sprint International is pushing packet-switch network technology based on the X.25 OSI standard. The X.25 data network is becoming the architecture of choice by PTTs and commercial service providers in East and West Europe, Africa, Latin America, and Asia.

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Parent company U.S. Sprint maintains subsidiaries, Telenet Japan and Telenet United Kingdom.

Sprint International sees EDI as an adjunct, or as a member of the electronic messaging family of services offered.

Alliances

Telenet's single major alliance is with Sterling Software Ordernet. Ordernet provides the EDI-specific services (compliance checking, on-network translation, detailed billing, mailboxing, etc.) that Telenet offers to its customers.

Telenet maintains joint marketing alliances with vendors of EDI translation software. The vendors are: EDI Inc. (Telink PC translator product), Sterling Software/Metro-Mark (TranSlator product for mid-range computers and Doculink product for telecommunications), and the APL Group (QualEDI product for PCs)

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PUBLIC NETWORK RATE SCHEDULE[1]

Effective May 1989

I. Network Access Charges[2]

A. Dedicated Access Facilities (DAFs)

DAF Services include a leased channel port at designated Telenet Access Centers within the continental U.S., the leased line between the customer's location and the access center, and the associated modems.

1. Asynchronous

Speed of Service (bps)	Installation Charge[3]	Monthly Charge[4]
300-1200	$1200	$ 600

2. Async-to-3270

Speed of Service (bps)	Installation Charge[3]	Monthly Charge[4] Simultaneous Session Support		
		1-8	9-16	Up to 32
4800	$ 1700	$ 1650	$ 1950	Quotable
9600	$ 1700	$ 1975	$ 2275	Quotable
19200	$ 1700	N/A	N/A	$3700

3. SDLC and 3270 BSC

Type	Speed of Service (bps)	Installation Charge[3]	Monthly Charge[4]
Terminal	4800	$ 1200	$ 425
Terminal	9600	$ 1200	$ 650
Host	4800	$ 1200	$ 1200
Host	9600	$ 1200	$ 1525

4. Multidrop Plus

Terminal DAFs Installed/ 9600 bps Host DAF	Installation Charge[3]	Monthly Charges/ Terminal DAF 4800 bps[5]	9600 bps[5]
3	$ 3600	$ 785	$ 935
4	$ 4800	$ 735	$ 885
5	$ 6000	$ 695	$ 845
6	$ 7200	$ 660	$ 810
7	$ 8400	$ 625	$ 775
8	$ 9600	$ 590	$ 740

Multidrop Plus Host and Terminal DAFs use either the SDLC or 3270 BSC protocol. Host and Terminal DAFs include leased channel ports at designated Telenet Access Centers, the leased line between the customer's location and the access center, and the associated modems. Traffic between the Host DAF and Terminal DAFs is also included, therefore traffic charges are not applicable.

A 9600 bps Host DAF is included; pricing is based on the number of Terminal DAFs assigned to the Host DAF. Each 9600 bps Host DAF can support 3-8 Terminal DAFs at speeds of 4800 or 9600 bps.

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5. X.25

Speed of Service (bps)	Installation Charge[3]	Monthly Charge[4]
2400	$ 1200	$ 1000
4800	$ 1200	$ 1200
9600	$ 1200	$ 1525
14400	$ 1500	$ 2000
19200	$ 1500	$ 2550
56000	Quotable	Quotable

An X.25 network interface must be used in conjunction with an X.25 DAF. (See separate rate schedule for Telenet Processor Network Interface Products and list of Telenet Certified X.25 Network Interface Products.)

6. Dual-DAF

Dual-DAF Service provides two termination points at a customer site extending from one physical network link. The dual connections each operate at 4800 bps for a 9600 bps Dual-DAF, or at 9600 bps for a 19200 bps Dual-DAF. Each of the connections can support X.25, SDLC, 3270 BSC or Async-to-3270 [6] applications.

Type	Connections Supported	Speed of Service (bps)	Installation Charge[7]	Monthly Charge[4]
Terminal	SDLC, 3270 BSC	9600	$ 1200	$ 800
Terminal/Host	SDLC, 3270 BSC/X.25, SDLC, 3270 BSC, Async-to-3270	9600	$ 1200	$ 1450
Host	X.25, SDLC, 3270 BSC, Async-to-3270	9600	$ 1200	$ 1800
Host	X.25, SDLC, 3270 BSC, Async-to-3270	19200	$ 1500	$ 2800

B. Dial Access Services

1. Public Dial-In

Public Dial-In Service provides access to the Telenet network via the local exchange and message toll telephone network. The stated charges are based upon call duration.

All applicable telephone message unit and toll charges must be paid by the customer or user; collect telephone calls are not accepted. The rates are chargeable for each network call, and the charge is billed for each minute or fraction thereof rounded to the next higher minute; the resulting charge is rounded to the next higher cent. A minimum charge period of two minutes applies to each network call.

In-WATS service provides access to the Telenet network from any point in the continental U.S. via the telephone network.

a. DataCall Plus℠ — Asynchronous Service

	Dial Location	Hourly Charge Standard	Hourly Charge 1 Year Arrangement
300-2400 bps:	Class A Access Center	$ 7.50	$ 6.00
	Class B and C Access Centers	$ 9.00	$ 7.50
	In-WATS	$15.50	$14.00
9600 bps:	Class A Access Center	$ 9.50	$ 8.00
	Class B and C Access Centers	$11.00	$ 9.50
	In-WATS	$17.50	$16.00

Traffic is included for 300 to 2400 bps, therefore traffic charges are not applicable. For 9600 bps, up to 20 kilosegments of traffic per hour are included. Additional traffic is charged at $.98 per kilosegment.

b. DataCall Plus℠ — X.25 Service

	Dial Location	Hourly Charge Standard	Hourly Charge 1 Year Arrangement
1200-2400 bps:	Class A Access Center	$ 7.50	$ 6.00
	Class B and C Access Centers	$ 9.00	$ 7.50
	In-WATS	$15.50	$14.00

Traffic is included for 1200 to 2400 bps, therefore traffic charges are not applicable. The service supports multiple virtual connections on a single network call. When connecting to hosts within a customer organization, the connect time charges will be based upon the overall duration of the network call instead of the combined connect times of each separate virtual connection. In addition, there will be a $.25 charge for each subsequent virtual connection established during the network call. (Certain restrictions may apply to this offering.) When connecting to hosts outside of a customer organization, charges will be based upon the individual connect time of each virtual connection established.

c. Async-to-3270 Service

Public Dial-In rates apply, dependent upon type of customer access.

2. Private Dial-In

Private Dial-In Service includes the associated modem at the Telenet Access Center as well as the local exchange line from the telephone network.

a. Asynchronous Dial Service

	Dial Location	Installation Charge[3]	Monthly Charges/ Port/Site		
			1-5	6-15	Over 15
300-1200 bps:	Class A Access Center	$600	$290	$280	$270
	Class B Access Center	$600	$460	$445	$435
2400 bps:	Class A Access Center	$600	$355	$345	$335
	Class B Access Center	$600	$495	$480	$470
9600 bps:	Class A Access Center	$600	$450	$435	$425

b. X.25 Dial℠ Service

	Dial Location	Installation Charge[3]	Monthly Charges/ Port/Site		
			1-5	6-15	Over 15
1200-2400 bps:	Class A Access Center	$600	$355	$345	$335
	Class B Access Center	$600	$495	$480	$470
4800 bps:	Class A and B Access Centers	$600	$550	$535	$515

c. Async-to-3270 Service

Private Dial-In rates apply, dependent upon type of customer access.

d. SDLC and 3270 BSC Service

	Dial Location	Installation Charge[3]	Monthly Charges/ Port/Site 1-5	6-15	Over 15
2400 bps:	Class A and B Access Centers	$600	$275	$265	$255
4800 bps:	Class A and B Access Centers	$600	$375	$365	$355

3. Outdial

a. Private Outdial Service

Private Outdial Service includes the associated modem at the Telenet Access Center and the automatic calling unit. Customers will be responsible for the installation and monthly charges associated with the local exchange line, FX or WATS service.

	To Telephone Networks From:	Speed of Service (bps)	Installation Charge[3]	Monthly Charge/Port
Asynchronous:	Class A Access Center	300-2400	$600	$250
	Class B Access Center	300-2400	$600	$325

II. Traffic Charges

Traffic charges are applicable for network access unless otherwise specified. Traffic is charged at $1.40 per kilosegment (1,000 segments). A segment has a billable length of up to 64 characters.

III. Other Services and Features

A. Services

1. Access Management Services

Enhanced feature categories including mnemonic host code addresses, as well as accounting and access controls, complement the network management services that are standard with data transmission via the Telenet® Public Data Network.

	Installation Charge	Monthly Charge
Mnemonic Host Codes		
Each Host Code	$ 50	$ 50
Reserve Host Code	$ 50	$ 25
Change Address of Host Code	$100	N/A
ID/Passwords		
0-500 (each)	$ 5	$ 4
Next 2000 (each)	$ 5	$ 3
Each Additional	$ 5	$ 2
Change ID Parameters (each)	$ 5	N/A

When more than three Mnemonic Host Codes are ordered, a minimum of 10 ID/Passwords are required per host code.

2. Emergency Support Services

These service options provide a variety of dial back-up options for connection to the Telenet network. X.25 DAFs are supported by all of the service options. SDLC and 3270 BSC DAFs are supported by the Line Back-Up and Disaster Host Access options only.

	Speed of Service (bps)	Installation Charge[8]	Monthly Charge
Line Back-Up			
X.25, SDLC, 3270 BSC DAF	4800 or 9600	$ 1000	$ 300
Dual-DAF	9600	$ 1000	$ 400
X.25 DAF	19200	$ 1000	$ 400
Dual-DAF	19200	$ 1000	$ 500
Access Zone Back-Up	4800 or 9600	$ 1600	$ 600
Disaster Host Access	4800 or 9600	$ 1600	$ 400
Each Additional Arrangement		$ 600	$ 100
Disaster Host Access Plus	4800 or 9600	$ 2000	$ 700
Each Additional Arrangement		$ 1000	$ 600

B. Features

1. Operating	Installation Charge	Monthly Charge
Rotary Feature	$ 100	$ 100
Private Network Feature		
1st Station	$ 100	$ 25
Additional Stations	$ 5	$ 2
Software Parameter Change	$ 100	N/A

2. Accounting

Detailed Connection Report

This monthly charge includes either a tape or printout. There is an additional $50 charge when both tape and printed report are ordered.

Monthly Connections	Installation Charge	Monthly Charge
1-10,000	N/A	$ 250
10,001-50,000	N/A	$ 500
50,001 or more	N/A	$ 750

IV. Monthly Account Charges

Regular Account	$ 140
Billing Sub-Account	$ 20
ID/Password Account	$ 20

V. Miscellaneous Charges

Dedicated Access Facility (DAF) Modifications

Upgrade to Higher Speed	50% of Standard Installation Charge
Upgrade of Async-to-3270 Ports	50% of Standard Installation Charge
Downgrade to Lower Speed	Standard Installation Charge
Location Move within Same Building	50% of Standard Installation Charge
Location Move to Another Building	Standard Installation Charge

Nonprime Shift Installation Surcharge

Installation of Telenet services and equipment, and moving of Telenet equipment on customer premises, normally occurs during prime shift hours (8 a.m. to 5 p.m., local time, Monday through Friday). When the customer requests that an installation or move requiring the participation of Telenet field personnel at the affected Telenet Access Center(s) and/or customer premises be accomplished in whole or in part during nonprime shift hours, and Telenet agrees to comply with such a request, the charge set forth below applies in addition to any other applicable nonrecurring installation or move charges.

Nonrecurring Surcharge	$250

Maintenance Service Charge

This charge only applies for maintenance visits when the service difficulty or trouble report results from the use of equipment or facilities provided by the customer or authorized user.

Each visit—$200 plus reasonable travel expenses incurred by Telenet.

Nonprime Shift Maintenance Charge

Maintenance of Telenet services and equipment normally occurs during prime shift hours (8 a.m. to 5 p.m., local time, Monday through Friday). When the customer requests that maintenance requiring the participation of Telenet field personnel at the affected Telenet Access Center(s) and/or customer premises be accomplished in whole or in part during nonprime shift hours, and Telenet agrees to comply with such a request, the charge set forth below applies.

Nonrecurring Charge	$250

NOTES:

1 *Telenet shall have the right to revise its charges upon 30 days prior written notice because of increases in the rates of underlying carriers ("Rate Escalation"). Increases in Telenet's charges due to Rate Escalation shall be calculated in accordance with Telenet's policy for Rate Escalation. Increases due to Rate Escalation shall apply regardless of the order term for Product and Service.*

2 *A minimum of 50 segments per virtual connection applies to all forms of network access.*

3 *When multiple private dial ports at the same Telenet Access Center location or multiple Dedicated Access Facilities terminating at the same customer address are ordered at the same time for concurrent installation, a $300 discount applies for each nonrecurring installation charge beyond the first one.*

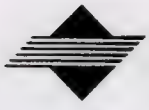
4 *This rate applies when the distance between the customer's location and the Telenet Access Center is 100 miles or less. There is an additional charge of $125 for every additional 100 miles or fraction thereof.*

5 *This rate applies for Intra-LATA connections between the customer's location and the nearest Telenet Access Center. For Inter-LATA connections, there is an additional charge of $200 per month for the first 250 miles and $100 for every additional 100 miles.*

6 *An additional monthly charge of $450 for support of eight simultaneous sessions, or $750 for 16 simultaneous sessions will be assessed for Async-to-3270 connections. The associated installation fee will be increased by $500.*

7 *Charges are based on concurrent installation of Dual-DAF terminations. Maintenance service charges apply to additional site visits.*

8 *When a concurrent DAF installation occurs, the installation charges are: waived for Line Back-Up; reduced to $600 for Disaster Host Access if the customer back-up host is located at an alternate site and waived if located at the same site; reduced to $600 for Access Zone Back-Up; reduced to $1000 for Disaster Host Access Plus if the customer back-up host is located at an alternate site and $400 if located at the same site.*



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201/SE05M589

PUBLIC NETWORK RATE SCHEDULE [1]

FOR INTERNATIONAL ACCESS LOCATIONS

Effective May 1989

I. Access Charges to Overseas Locations

Rates are applicable to service from Telenet Access Centers in the continental United States, Alaska and Hawaii to the countries listed.

Country	Network	DNIC	Duration[2]	Volume[3]	Traffic Direction[4]	Collect Calls Allowed[5]
American Samoa	PACNET	5351	$12.00/Hr	$16.00/KS	Bidirectional	No
Antigua	AGANET	3443	—	—	Incoming	No
Argentina	ARPAC UDTS	7222, 7221 7220	$12.00/Hr	$12.00/KS	Bidirectional	No
Australia	AUSTPAC OTC DATA ACCESS	5052 5053	$10.00/Hr	$12.00/KS	Bidirectional	No
Austria	DATEX-P RADAUS-DATA	2320, 2322 2329	$10.00/Hr	$12.00/KS	Bidirectional	No
Bahamas	BATELCO	3640	—	—	Incoming	No
Bahrain	IDAS	4263	$12.00/Hr	$16.00/KS	Bidirectional	No
Barbados	IDAS	3420, 3423	—	—	Incoming	No
Belgium	DCS	2062, 2064	$10.00/Hr	$12.00/KS	Bidirectional	No
Bermuda	IDAS	3500, 3504	$10.00/Hr	$12.00/KS	Bidirectional	No
Brazil	INTERDATA RENPAC	7240 7241	$10.00/Hr	$12.00/KS	Bidirectional	No

Country	Network	DNIC	Duration[2]	Volume[3]	Traffic Direction[4]	Collect Calls Allowed[5]
Canada	DATAPAC	3020			Bidirectional	Yes
	Prepaid from U.S.					
	To DATAPAC 3000					
	Public Dial		$ 5.10/Hr	$ 2.35/KP		
	Dedicated or Private Dial		$ .60/Hr	$ 2.35/KP		
	In-WATS		$24.17/Hr	$ 2.35/KP		
	To DATAPAC 3101					
	Public Dial		$ 5.10/Hr	$ 5.10/KP		
	Dedicated or Private Dial		$ .60/Hr	$ 5.10/KP		
	In-WATS		$24.17/Hr	$ 5.10/KP		
	Collect from Canada					
	From DATAPAC 3000		$ .60/Hr	$ 2.35/KP		
	From DATAPAC X.25 Dial		$ 2.40/Hr	$ 2.35/KP		
	From DATAPAC 3101					
	Public Dial		$ 2.40/Hr	$ 5.10/KP		
	Dedicated or Private Dial		$ .60/Hr	$ 5.10/KP		
	GLOBEDAT	3025				
Cayman Islands	IDAS	3463	—	—	Incoming	No
Chile	ENTEL	7302	$12.00/Hr	$12.00/KS	Bidirectional	Yes
	CHILE-PAC	7303				
	VTRNET	7305				
China, PR	PKTELCOM	4600	—	—	Incoming	No
Colombia	DAPAQ	7320	$10.00/Hr	$ 12.00/KS	Bidirectional	No
Costa Rica	RACSA-PAC	7120, 7122, 7128, 7129	$ 8.00/Hr	$ 10.00/KS	Bidirectional	Yes
Curacao/ Neth. Antilles	UDTS	3620	—	—	Incoming	No
Denmark	DATAPAK	2382, 2383	$10.00/Hr	$12.00/KS	Bidirectional	No
Dominican Republic	CODETEL	3701	$ 8.00/Hr	$ 8.00/KS	Bidirectional	Yes
Egypt	ARENTO	6023	—	—	Incoming	No
Faroe Islands	FAROEPAC	2881	$10.00/Hr	$12.00/KS	Bidirectional	No
Finland	DATAPAK	2442	$10.00/Hr	$12.00/KS	Bidirectional	No
France	TRANSPAC	2080	$ 8.00/Hr	$10.00/KS	Bidirectional	No
	NTI	2081, 2082				
French Antilles	DOMPAC	3400	$10.00/Hr	$12.00/KS	Bidirectional	No
French Guyana	DOMPAC	7420	$10.00/Hr	$12.00/KS	Bidirectional	No
French Polynesia	TOMPAC	5470	$12.00/Hr	$16.00/KS	Bidirectional	No
Gabon	GABONPAC	6282	$12.00/Hr	$16.00/KS	Bidirectional	No

Country	Network	DNIC	Duration[2]	Volume[3]	Traffic Direction[4]	Collect Calls Allowed[5]
Germany F.R.	DATEX-P	2624	$ 8.00/Hr	$10.00/KS	Bidirectional	No
Greece	HELPAK	2022	$10.00/Hr	$12.00/KS	Bidirectional	No
Greenland	DATAPAK	2402	$10.00/Hr	$12.00/KS	Bidirectional	No
Guam	PACNET	5351	$12.00/Hr	$16.00/KS	Bidirectional	No
Guatemala	GUATEL	7040	—	—	Incoming	No
Honduras	HONDUTEL	7080	—	—	Incoming	No
Hong Kong	INTELPAK DATAPAK	4542 4545	$12.00/Hr	$16.00/KS	Bidirectional	No
Hungary	PCTO	2161	$10.00/Hr	$12.00/KS	Bidirectional	No
Iceland	ICEPAC	2740	$10.00/Hr	$12.00/KS	Bidirectional	No
India	GPSS	4040	—	—	Bidirectional	No
Indonesia	SKDP	5101	$12.00/Hr	$16.00/KS	Bidirectional	No
Iraq (via Bahrain)	IDAS	4260	—	—	Incoming	No
Ireland	EIRPAC IPSS (Eire)	2724 2721	$10.00/Hr	$12.00/KS	Bidirectional	No
Israel	ISRANET	4251	$12.00/Hr	$16.00/KS	Bidirectional	Yes
Italy	ITAPAC	2227	$10.00/Hr	$12.00/KS	Bidirectional	No
Ivory Coast	SYNTRANPAC	6120, 6122	$12.00/Hr	$16.00/KS	Bidirectional	No
Jamaica	JAMANTEL	3380	—	—	Incoming	No
Japan	GLOBALNET DDX-P VENUS-P	4400 4401 4408	$11.00/Hr $12.00/Hr	$13.00/KS $16.00/KS	Bidirectional Bidirectional	Yes No
Jordan (via Bahrain)	IDAS	4260	—	—	Incoming	No
Korea	DACOM-NET	4501	$12.00/Hr	$16.00/KS	Bidirectional	No
Kuwait	PDN	4190	—	—	Incoming	No
Liechtenstein (via Switzerland)	TELEPAC	2284	—	—	Incoming	No
Luxembourg	LUXPAC	2704, 2709	$10.00/Hr	$12.00/KS	Bidirectional	No
Malaysia	MAYPAC	5021	$12.00/Hr	$16.00/KS	Bidirectional	No
Mauritius	MAURIDATA	6170	$12.00/Hr	$16.00/KS	Bidirectional	No
Mexico	TELEPAC	3340	$ 6.50/Hr	$ 7.00/KP	Bidirectional	Yes
Micronesian Islands	PACNET	5351	$12.00/Hr	$16.00/KS	Bidirectional	No
Monaco (via France)	TRANSPAC	2080	—	—	Incoming	No
Netherlands	DATANET-1 TELEPAD DATANET	2041 2044 2049	$ 8.00/Hr	$10.00/KS	Bidirectional	No
New Caledonia	TOMPAC	5460	$12.00/Hr	$16.00/KS	Bidirectional	No

Country	Network	DNIC	Duration[2]	Volume[3]	Traffic Direction[4]	Collect Calls Allowed[5]
New Zealand	PACNET	5301	$10.00/Hr	$12.00/KS	Bidirectional	No
Norway	DATAPAK	2422	$10.00/Hr	$12.00/KS	Bidirectional	No
Panama	INTELPAQ	7141, 7142	$10.00/Hr	$12.00/KS	Bidirectional	Yes
Peru	No name	7160	—	—	Incoming	No
Philippines	EASTNET	5156	$12.00/Hr	$12.00/KS	Bidirectional	Yes
Portugal	TELEPAC	2682	$10.00/Hr	$12.00/KS	Bidirectional	No
Puerto Rico	UDTS	3301	$ 5.00/Hr	$ 4.00/KS	Bidirectional	Yes
Qatar (via Bahrain)	DOHPAK	4260	—	—	Incoming	No
Reunion Islands	DOMPAC	6470	$10.00/Hr	$12.00/KS	Bidirectional	No
Saipan	PACNET	5351	$12.00/Hr	$16.00/KS	Bidirectional	No
Saudi Arabia (via Bahrain)	IDAS	4260	—	—	Incoming	No
Singapore	TELEPAC	5250, 5251, 5252	$12.00/Hr	$16.00/KS	Bidirectional	No
South Africa	SAPONET-P	6550	$12.00/Hr	$16.00/KS	Bidirectional	No
Spain	TIDA IBERPAC	2141 2145	$10.00/Hr	$12.00/KS	Bidirectional	No
Sudan (via Bahrain)	IDAS	4260	—	—	Incoming	No
Sweden	DATAPAK	2402	$10.00/Hr	$12.00/KS	Bidirectional	No
Switzerland	TELEPAC	2284	$10.00/Hr	$12.00/KS	Bidirectional	No
Taiwan	UDAS PACNET	4877 4872	$12.00/Hr	$12.00/KS	Bidirectional	No
Thailand	IDAR	5200	—	—	Incoming	No
Trinidad & Tobago	TEXTEL	3745	$ 8.00/Hr	$ 8.00/KS	Bidirectional	No
Tunisia	RED-25	6050	$12.00/Hr	$16.00/KS	Bidirectional	No
Turkey	DATAPAK	2860	$12.00/Hr	$12.00/KS	Bidirectional	No
Turks Island	IDAS	N/A	—	—	Incoming	No
United Arab Emirates	EMDAM	4260	$12.00/Hr	$16.00/KS	Bidirectional	No
United Kingdom	IPSS PSS	2341 2342	$10.00/Hr	$12.00/KS	Bidirectional	No
USSR	IASNET	2502	$10.00/Hr	$12.00/KS	Bidirectional	No
Vanuatu	VIAPAC	5410	$12.00/Hr	$16.00/KS	Bidirectional	No
Virgin Islands	UDTS	332X	—	—	Incoming	No
Yugoslavia	YUPAC	2201	$12.00/Hr	$16.00/KS	Bidirectional	No
Zimbabwe	ZIMNET	6482	$12.00/Hr	$16.00/KS	Bidirectional	No

II. Network Access Charges for Alaska and Hawaii

A. Access Charges

Duration and volume charges are applicable for all services unless otherwise specified.

1. Continental United States

Rates apply to service between Alaska or Hawaii, and Telenet Access Centers in the continental U.S.

Location	Duration[2]	Volume[3]
Alaska*	$4.00/Hr	$4.00/KS
Alaska**	$6.50/Hr	$7.00/KP
Hawaii	$6.50/Hr	$5.50/KP

*For connection via AlaskaNet (collect calls only).

** For connection via Telenet Access Centers in Alaska.

2. Canada

Rates apply to service between Telenet Access Centers in Alaska or Hawaii and Canada.

Service	Duration[2]	Volume[3]
Prepaid from U.S.		
DATAPAC 3000		
Public Dial	$5.10/Hr	$7.60/KP
Dedicated or Private Dial	$ .60/Hr	$7.60/KP
DATAPAC 3101		
Public Dial	$5.10/Hr	$8.20/KP
Dedicated or Private Dial	$ .60/Hr	$8.20/KP

3. Puerto Rico

Rates apply to service between Telenet Access Centers in Alaska or Hawaii and Puerto Rico.

Location	Duration[2]	Volume[3]
Puerto Rico	$5.10/Hr	$7.60/KP

4. Between Alaska and Hawaii

Rates apply to service from Hawaii to Alaska and from Telenet Access Centers in Alaska to Hawaii.

Location	Duration[2]	Volume[3]
Alaska/Hawaii	$5.10/Hr	$7.60/KP

B. Dedicated Access Facilities (DAFs)

Surcharges are applied to standard charges listed in the *Public Network Rate Schedule* for continental U.S. access locations.

1. Alaska

DAF Services in Alaska are available via Telenet Access Centers in Anchorage and Juneau for SDLC and 3270 BSC (X.25 DAF Services are available via AlaskaNet).

The following surcharges apply to the installation and monthly charges. Duration charges are not applicable.

Service	Installation Surcharge	Monthly Surcharge
SDLC and 3270 BSC	$600	$100

2. Hawaii

DAF Services including: Asynchronous, Async-to-3270, SDLC and 3270 BSC, X.25, Dual-DAF, and Multidrop Plus are available in Hawaii at speeds up to 9600 bps with the following surcharges. Duration charges are not applicable.

Service	Installation Surcharge	Monthly Surcharge	
		Oahu	Other Islands
Asynchronous, Async-to-3270, SDLC and 3270 BSC, X.25, Dual-DAF	Additional 50%	$100	$350
Multidrop Plus	$600 per drop	$100	$350

C. Private Dial-In

Surcharges are applied to standard charges listed in the *Public Network Rate Schedule* for continental U.S. access locations.

1. Alaska

Private Dial-In Services in Alaska are available via Telenet Access Centers in Anchorage and Juneau, and are limited to SDLC and 3270 BSC.

The following surcharges apply to the installation and monthly charges. Duration charges are not applicable.

Service	Installation Surcharge	Monthly Surcharge
SDLC and 3270 BSC	$300	$100

2. Hawaii

Private Dial-In Services including: Asynchronous, SDLC and 3270 BSC are available in Hawaii with the following surcharges. Duration charges are not applicable.

Service	Speed of Service (bps)	Installation Surcharge	Monthly Surcharge
Asynchronous	300-2400	$300	$100
SDLC and 3270 BSC	2400-4800	$300	$100

D. Emergency Support Services

These service options provide a variety of dial back-up options for connection to the Telenet network. X.25 DAFs are supported by all of the service options. SDLC and 3270 BSC DAFs are supported by the Line Back-Up and Disaster Host Access options only.

Surcharges are applied to standard charges listed in the *Public Network Rate Schedule* for continental U.S. access locations.

1. Alaska

Emergency Support Services in Alaska are available via Telenet Access Centers in Anchorage and Juneau, for SDLC and 3270 BSC DAFs. The following surcharges apply to the installation and monthly charges.

Service	Speed of Service (bps)	Installation Surcharge	Monthly Surcharge
Line Back-Up			
SDLC, 3270 BSC DAF	4800 or 9600	Additional 50%	$100
Dual-DAF	9600	Additional 50%	$100
Disaster Host Access	4800 or 9600	Additional 50%	$100

2. Hawaii

Emergency Support Services are available for X.25, SDLC and 3270 BSC DAFs in Hawaii. The following surcharges apply to the installation and monthly charges.

Service	Speed of Service (bps)	Installation Surcharge	Monthly Surcharge
Line Back-Up			
X.25, SDLC,	4800 or 9600	Additional 50%	$100
3270 BSC DAF,	9600	Additional 50%	$100
Dual-DAF			
Access Zone Back-Up	4800 or 9600	Additional 50%	$100
Disaster Host Access	4800 or 9600	Additional 50%	$100
Disaster Host Access Plus	4800 or 9600	Additional 50%	$100

III. Multidrop Plus Service

Multidrop Plus Service supports SDLC communications from continental and non-continental U.S. locations. A Telenet Host DAF, located within the continental U.S., is required to terminate foreign traffic; the same Host DAF can be used to support domestic SDLC and Multidrop Plus traffic. Refer to the *Public Network Rate Schedule* for continental U.S. access locations for applicable rates.

Charges based in foreign currency are converted by Telenet to U.S. dollars at the exchange rate posted in *The Wall Street Journal* applicable to the last Friday of the month to which the invoice applies.

Location[6]	Monthly Country Service Charge[7]	Monthly Traffic Charge[8]	Foreign Terminal DAFs Installation Charge	Foreign Terminal DAFs Monthly Charge[9] 4800 bps	Foreign Terminal DAFs Monthly Charge[9] 9600 bps
Alaska	N/A	$ 7.00/KP	$1800	$ 525	$ 750
	N/A	N/A	$1800	$ 1525	$ 1675
Canada	$300	$4.80/KP	C$ 200	C$ 304	C$ 304
Japan	$300	$11.75/KS	¥240,000	¥130,000	¥150,000
Puerto Rico	$100	$ 5.00/KS	$1200	$ 425	$ 500
	N/A	N/A	$1200	$ 2550	$ 2625
U.K.	$300	£4.5/KS	£100	N/A	£775

see NOTES on the next page

NOTES:

1 *Telenet shall have the right to revise its charges upon 30 days prior written notice because of increases in the rates of underlying carriers ("Rate Escalation"). Increases in Telenet's charges due to Rate Escalation shall be calculated in accordance with Telenet's policy for Rate Escalation. Increases due to Rate Escalation shall apply regardless of the order term for Product and Service.*

2 *Chargeable time for each virtual call is billed per minute or fraction thereof, rounded up to the next higher whole minute. A minimum charge of one minute applies to each virtual call.*

3 *KP = Kilopacket*
A minimum charge of fifty (50) packets applies per virtual call. Fractions of kilopackets transmitted during each virtual call will be pro-rated and rounded to the next higher cent. A packet has a billable length of up to 1,024 bits of user information, or up to 128 characters of user information, unless otherwise stated.

KS = Kilosegment
A minimum charge of ten (10) segments applies per virtual call. Fractions of kilosegments transmitted during each virtual call will be measured in increments of ten (10) segments. A segment has a billable length of up to 512 bits, or up to 64 characters.

4 *Traffic direction indicates call origination capabilities for a specified location. Where a location is listed as "incoming," a call must originate from that overseas location for communications to occur; the call cannot originate from the Telenet® Public Data Network. Once a virtual call has been established, interactive communications are possible.*

5 *Telenet allows collect (destination paid) calls to a number of overseas locations. The ability to place collect calls is dependent upon agreements between overseas administrations (PTTs) and U.S. carriers.*

6 *For Alaska and Puerto Rico, two service rate options are available. Where traffic charges are not applicable (N/A), traffic is included in the monthly foreign Terminal DAF charges.*

7 *This is a recurring service charge per country and is independent of the actual number of connections within any country.*

8 *U.K.: Traffic above 500 kilosegments within a calendar quarter is charged at £2.7/kilosegment.*

Canada: Traffic above 400 kilopackets within a month is charged at $4.10/kilopacket.

9 *Alaska: Rates are applicable to Anchorage and Juneau only. Contact your Telenet representative to obtain price quotes for locations outside these areas.*

Japan: Rates are applicable to the Tokyo business area only. Contact your Telenet representative to obtain price quotes for locations outside the area.

Telenet
A US Sprint Company

12490 Sunrise Valley Drive
Reston, Virginia 22096

1-800/TELENET or
800/835-3638
703/689-5700
Telex:7400057

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205/SE05M589

Telenet
A US Sprint Company

Telenet Communications Corporation
Contracts Administration
12490 Sunrise Valley Drive
Reston, Virginia 22096
(703) 689-6000

MASTER AGREEMENT FOR DATA COMMUNICATIONS SERVICE

Customer Name	Date
Customer Address	Master Agreement Number
City	State and Zip Code
Customer Contact	Phone

In accordance with the terms of this Agreement, Telenet Communications Corporation ("Telenet") agrees to make available to the above customer ("Customer"), certain Telenet Products and Services, as may be ordered from time-to-time by Customer, when such orders are accepted by Telenet. All such Orders shall identify the Product(s) and/or Services(s) ordered. All accepted Orders shall become a part of this Agreement.

THE PARTIES HAVE READ THIS AGREEMENT CONSISTING OF (4) PAGES HEREIN, AND AGREE TO BE BOUND BY ALL OF ITS TERMS. THE PARTIES FURTHER AGREE THAT IT CONSTITUTES THE COMPLETE AND EXCLUSIVE STATEMENT OF THE AGREEMENT BETWEEN THEM, AND SUPERSEDES ALL PROPOSALS, ORAL, OR WRITTEN, AND ALL OTHER COMMUNICATIONS BETWEEN THEM RELATING TO THE SUBJECT HEREOF.

TELENET COMMUNICATIONS CORPORATION

	Customer Name
Authorized Signature & Date	Authorized Signature & Date
Name (Please print or type)	Name
Title	Title
Sales Representative	Address if different from above

1. TERMS OF AGREEMENT.

This Master Agreement will be effective on the date it is accepted by Telenet at Reston, Virginia, and shall remain in force and effect unless terminated as provided herein.

2. COSTS AND CHARGES.

a. **General.** Telenet will determine the lease charges, service usage charges, and installation charges applicable for each Product and Service provided. Telenet will measure usage of Products and Services in accordance with Telenet's then current policy. The charges for Products and Services as set forth in any Order are subject to discount pursuant to Telenet's then current policies relating to volume and off-peak usage. Telenet reserves the right at its sole discretion to amend these policies on 60 days written notice. Charges for Products and Services supplied prior to the first day of the term shall be determined by Telenet, prorated, and invoiced to the Customer. Fixed charges will be invoiced in advance. The charges will be invoiced monthly and payment must be received by Telenet within 30 days after the date of the invoice. Interest charges of 1¾ percent per month (or the highest rate permitted by law) will accrue on all amounts not paid within 30 days of invoicing. Interest will accrue daily. The Customer will pay or reimburse Telenet for any and all sales and use taxes, duties, or levies imposed by any authority, government, or government agency (other than the property taxes and taxes levied on Telenet's net income) in connection with the Products and Services provided herein.

b. **Tariff Applicability.** In the event that any Product(s) and Service(s) ordered by Customer is subject to a tariff filed by Telenet with the Federal Communications Commission, the terms and conditions of such tariff (including price) shall govern Customer's use of such Product(s) and Service(s).

c. **Rate Escalation.** Telenet shall have the right to increase its charges upon 30 days prior writted notice because of increases in the rates of underlying carriers ("Rate Escalation"). Increases in Telenet's charges due to Rate Escalation shall be calculated in accordance with Telenet's policy for Rate Escalation. Increases due to Rate Escalation shall apply regardless of the order term for the Product and Service.

d. **Other Charges.** The Customer agrees to pay, at Telenet's applicable time and material rates then in effect, all charges for maintenance and other service activities, and to pay for loss or damage to the Products caused by: (1) Use of the Products and Services for purposes other than that for which designed; (2) Alterations; (3) Failing to maintain a suitable environment as specified by Telenet; (4) Tampering with or attempting to adjust or repair the Products and Services; (5) Customer negligence of any kind; or (6) Repetitive use of non-Telenet-provided supplies causing maintenance problems which would not have occurred had the correct supplies been used. Customer agrees to pay in accordance with Telenet's then current policy all charges incurred for cancel before start orders, order delays and change orders.

3. EXTENSION.

The term of each Product and Service is set forth on the Order for Data Communications Service. Ninety (90) day terms will automatically renew at then current rates for successive ninety (90) day renewal terms unless the Customer or Telenet by sixty (60) day written notice, notifies the other party that it does not wish to renew. Long term arrangements may be cancelled at the end of their term by providing sixty (60) days written notice prior to the conclusion of the term. Long term arrangements may be cancelled at the end of the term. Long term arrangements are renewed by initiating a new Order for Data Communications Service. Expired long term renewals without renewal orders automatically renew at the then current rates for successive ninety (90) day renewal terms. Telenet reserves the right to modify its charges for any Product or Service upon expiration of any term or renewal term.

4. TITLE.

Title to the Products and Services used hereunder shall at all times remain with Telenet and Customer has no property rights in such Products and Services. Customer's right to use the Products and Services are personal to Customer, non-exclusive and non-transferable.

5. PROPRIETARY RIGHTS AND INFORMATION PROTECTION.

Where Customer utilizes Telenet Products and Services containig programming or software, Telenet grants to the Customer a non-exclusive and non-transferable license to use the Software or Programming resident in such, for the sole purpose of enabling Customer to obtain Telenet services. Title to all Software and Programming is and shall remain with Telenet. Customer recognizes that Software and Programming used hereunder constitute valuable trade secrets of Telenet. Customer shall use its best efforts to protect and keep confidential all Software and Programming used by it and shall make no attempt to examine, copy, alter, "reverse engineer", tamper with, or otherwise misuse such Software and Programming.

f. Telenet will not be responsible for the installation, operation or maintenance of any equipment or software provided by a customer. Where such equipment is connected to Products and Services furnished pursuant to this Agreement, the responsibility of Telenet will be limited to the furnishing of facilities under this Agreement and to the maintenance and operation of such facilities in the proper manner. Telenet will not be responsible for the transmission and reception of signals by equipment furnished by the Customer.

g. Telenet will not be responsible to the Customer or any user if changes in any of Telenet's facilities, operations, procedures, Products or Services:

(1) render obsolete any equipment or software provided by the Customer (unless certified by Telenet);
(2) require modification or alteration to such equipment or software; or
(3) otherwise affect its performance.

9. INDEMNITIES.

a. If promptly notified in writing of any action brought against Customer based on a claim that Telenet's Products or Services used by Customer infringe a United States patent or copyright, Telenet will defend such action at its expense and will pay any and all fees, costs, or damages that may be finally awarded in such action and/or resulting settlement thereof. In the event that a final injunction is obtained against Customer prohibiting usage of Products or Services used hereunder or any part thereof by reason of infringement of a United States patent or copyright, Telenet will, at its option, either: (1) at its expense, procure the right for the Customer to continue using the Products and Services; or (2) direct Customer to return such Products or Services to Telenet at Telenet's expense. In the latter event, any order relating to such returned Product or Service shall terminate immediately.

b. Telenet will be indemnified and saved harmless by the Customer or user from and against all loss, liability, damage and expense, including reasonable counsel fees, due to:

(i) Claims and demands to property and injury or death to persons including payments made under any Workmen's Compensation Law or under any plan for employee's disability or death benefits, which may arise out of, or be caused by the construction, installation, maintenance, presence, use or removal of Customer systems, channels or terminal equipment connected, or to be connected, to Telenet Products or Services pursuant to this Agreement and all claims arising out of an act or omission of the officers, employees, agents or contractors of the Customer in connection with Telenet-provided channels.
(ii) Claims for libel, slander, invasion of privacy or infringement of copyright, and invasion and/or alteration of private records or data arising from any information, data or message transmitted over the network by Customer or its users.
(iii) Claims for infringement of patents arising from the use of apparatus and systems of the Customer in connection with facilities, Products or Services furnished by Telenet.

10. USE OF PRODUCTS AND SERVICES.

a. Telenet undertakes to install and maintain the Products and Services which it furnishes. The Customer may not, nor may it permit others to, rearrange, disconnect, remove or attempt to repair any Products or Services furnished by Telenet except upon written consent of Telenet.

b. The Products and Services are furnished subject to the condition that there will be no abuse or fraudulent use thereof. Abuse and fraudulent use of Products and Services includes:

(i) Obtaining or attempting to obtain service by rearranging, tampering with or making connection with any facilities of Telenet, or by any trick, scheme, false representation or false credit device, or by or through any other fraudulent means or devices whatsoever, with intent to avoid payment, in whole or in part, of the regular charges for the Product or Service.
(ii) Attempting to, or actually obtaining, accessing, altering, or destroying the data files, programs, procedures and/or information of another Telenet customer by rearranging, tampering with or making connection to any facilities of Telenet, or by any trick, scheme, false representation or through any other fraudulent means or devices whatsoever.
(iii) Assisting another to perform the acts prohibited in (i) or (ii) above.
(iv) Using the Product or Service in such a manner as to interfere unreasonably with the use of the service by one or more other customers or authorized users.

c. The Products and Services furnished under this Agreement shall not be used for any purpose or in any manner directly or indirectly in violation of the law or in aid of any unlawful act or undertaking.

6. MODIFICATIONS.

Customer agrees not to modify, alter, repair, attempt to repair, or to in any way tamper with the Products and Services provided to the Customer without the express written consent of Telenet ("Modification"). In the event of such Modification, Telenet shall be completely released from any liability or obligation (including any warranty or indemnity obligation) to Customer relative to the Product or Service modified. Customer shall be liable to Telenet for any costs or damages incurred by Telenet (including damage to the Telenet Network) caused by such modification.

7. INSTALLATION, ACCESS, AND CABLING.

a. **Site Alteration and Environment.** Customer shall, at its own expense, provide all necessary site alterations, electric current and circuits, air conditioning and other preparations required to comply with Telenet's installation and maintenance specifications, including but not limited to any unusual installation costs (e.g., conduits for connecting cable, special ceiling mounts, etc.).

b. **Access.** Customer will permit reasonable access to Customer's premises, at reasonable times during its normal business hours subject to Customer's reasonable security requirements, by employees, designees, or authorized independent contractors of Telenet, for the purpose of installation, inspection, maintenance, service, repair, replacement, relocation and removal of Products and Services and for the purpose of performing any acts contemplated by this Agreement. Customer shall also permit reasonable access to representatives of organizations furnishing communication lines, subject to Customer's reasonable security requirements.

c. **Cabling.** Telenet will be responsible for all cabling for the connection of power, and for connection of Telenet-supplied cable for Telenet-supplied Products and Services. Telenet will not be responsible for cabling between Customer-provided machines and the interface panels of Telenet-supplied Products and Services.

d. **Relocation.** Customer shall be responsible for the costs of any relocation of Products and Services once installed by Telenet.

8. WARRANTIES/LIMITATION OF LIABILITY.

a. Telenet warrants that all Products and Services provided will be in good working order on the day installed and certified by Telenet ready for use and that they will conform to Telenet's service specifications. Thereafter, Telenet will make such adjustments, repairs, and parts' replacement necessary to maintain the Products and Services in working order pursuant to Telenet's specifications subject to the provisions of this Agreement.

THE FOREGOING WARRANTIES ARE IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

b. In all situations involving performance or non-performance of Products and Services furnished under this Agreement, the Customer's sole remedy is adjustment or repair of the Product or Services.

For any other claim concerning performance or non-performance by Telenet, the Customer's damages, if any, shall be limited to those actually proven as directly attributable to Telenet and shall be subject to the limits set forth in this Agreement.

Telenet's liability for damages to the Customer for any cause whatsoever, and regardless of the form of action, whether in contract or in tort, including negligence, shall be limited to the lesser of $100,000 or monthly charges paid from the date said damages were incurred, but in no event more than 12 months of said charge for the specific Product or Service that allegedly causes the damage.

In no event will Telenet be liable for any damages caused by the Customer's failure to perform the Customer's responsibilities, or for any lost profits or other consequential damages, even if Telenet has been advised of the possibility of such damages, or for any claim against the Customer by any other Party.

c. Telenet is not liable to the Customer or any of the Customer's users for any act or omission of any other entity furnishing products or services which are required by Customer to use Telenet service. Nor will Telenet be liable for any damage or losses due the fault or negligence of the Customer or for the failure of any products or services provided by the Customer.

d. Telenet is not liable for any defacement of or damage to the premises of a Customer resulting from the furnishings of channels or equipment or the attachment of instruments, apparatus and associated wiring furnished by Telenet or any carrier on such premises or the installation or removal thereof, when such defacement or damage is not the result of negligence of Telenet's agents or employees.

e. Telenet is not liable, either in contract or in tort, for the unauthorized access to, or alteration, theft or destruction of data files, programs, procedure and/or information of a Customer or authorized user by any person through accident or by fraudulent means or devices, even if such access occurs as a result of Telenet's own negligence.

11. OBLIGATIONS OF THE CUSTOMER.

a. **Customer Liability.** The Customer shall be liable for:
   (i) Reimbursing Telenet for any loss through theft or vandalism of Telenet-provided Products or Services on the Customer's premises.
   (ii) Reimbursing Telenet for damages to Products or Services caused for any reason whatsoever including the negligence or willful acts of the officers, employees, agents or contractors, of the Customer.

b. **Customer-Provided Equipment.**
   (i) Where Telenet's Products and Services are available under this Agreement for use in connection with equipment or systems provided by a Customer, the operating characteristics of such equipment or systems shall be such as not to interfere with any of the Products or Services offered by Telenet. Such use is subject to the further provisions that the equipment or software of a Customer does not endanger the safety of Telenet employees or the public; damage or require change in or alteration to the Products or Services; impair the operation of Telenet; interfere with the proper functioning of such Products and Services; or otherwise injure the public in its use of Telenet's services. Upon notice from Telenet that the equipment or software provided by a Customer is causing or is likely to cause such hazard or interference, the Customer shall take steps as shall be necessary to remove the equipment. Telenet reserves the right to require Customer-provided equipment to be certified by Telenet prior to use with Telenet Products or Services.
   (ii) The Customer will be responsible for payment of a service charge for visits by Telenet or Telenets' agents to the premises of the Customer or authorized user where the service difficulty or trouble report results from the use of equipment or facilities provided by the Customer.

12. FORCE MAJEURE.

Telenet will not be responsible for any delay in or failure of shipment or delivery or other duties hereunder due to any occurrence commonly known as force majeure, including war, riots, embargoes, strikes, or other concerted acts of workmen (whether of Telenet or others), casualties or accidents, or any other causes, circumstances, or contingencies within or without the United States of America, whether of a similar or dissimilar nature to the foregoing, beyond Telenet's control, which prevent or hinder the design, manufacture, or delivery of any of its obligations hereunder.

Telenet will give the Customer notice in the event of any or more of the foregoing occurrences. Upon such notice, Telenet may cancel or delay performance hereunder for so long as such performance is delayed by such occurrence or occurrences, and in such event Telenet shall have no liability to Customer. Should such occurrence continue for more than 60 days, Customer may cancel this Agreement with no further liability.

13. TERMINATION.

a. Upon default by Customer, Telenet may, at its sole option:
   (i) Terminate any and all Products and Services used by Customer, retake and hold possession of any Products and Services (before, pending or after any action to recover any sums hereunder); and/or
   (ii) Telenet may cancel this Agreement forthwith and retain all payments made hereunder and recover the full unpaid balance of the charges and costs applicable to then current term of any Products and Services then used by Customer, as well as any other damages Telenet may have sustained because of Customer's default.

b. Neither the recovery of a judgment in such action nor the collection of any portion of such unpaid balance shall be deemed inconsistent with a waiver or prevention of any other right or remedy of Telenet hereunder provided for or referred to, or existing under applicable law.

c. For purposes of this Agreement "default" shall mean:
   (i) If Customer becomes the subject of voluntary or involuntary bankruptcy, insolvency, reorganization or liquidation proceedings, makes an assignment for the benefit of creditors, or admits in writing its inability to pay debts when due;
   (ii) If Customer fails to pay any amount within 10 days after notice that same is delinquent.
   (iii) If Customer fails after 20 days' written notice to remedy any other breach of the terms, conditions, obligations or representations contained in this Agreement.

d. In the event of default, Customer shall also pay to Telenet all reasonable expenses incurred by Telenet in connection with the enforcement of any of Telenet's rights hereunder, including reasonable attorney's fees.

14. NOTICES.

All notices from either party to the other shall be sent by registered or certified mail. Notice to Telenet shall be addressed to:

TELENET COMMUNICATIONS CORPORATION
12490 Sunrise Valley Drive
Reston, Virginia 22096
Attn: Contracts Administration

or, in case of notice to Customer, to the address specified on this Agreement unless written notice shall have been previously given otherwise.

15. ASSIGNMENT.

None of the Products or Services may be assigned or transferred by the Customer without the prior written consent of Telenet. Any attempt by Customer to assign or transfer any of the rights, duties, or obligations of this Agreement without Telenet's written consent is void.

16. GENERAL.

a. Each Product and Service remains Telenet's property and may be removed by Telenet at any time after discontinuance or termination thereof. Telenet shall have full and free access to each Product and Service for this purpose.

b. This Agreement and any Orders accepted under this Agreement are subject to the Customer's continuing credit worthiness.

c. Telenet may, upon 60 days' prior written notice to the Customer, discontinue any Product or Service under any Order or extension thereof, on its expiration date. Telenet also may discontinue Products and Services forthwith for failure of the Customer to comply with any of these terms and conditions applicable to such Products and Services.

d. No action, regardless of form, arising out of this Agreement may be brought by either party more than one year after the cause of action has arisen; except in the case of nonpayment, more than two years from the date of the last payment.

e. All accepted Orders shall become part of this Agreement. This Agreement and all such Orders shall cumulatively contain the entire contract between the parties. The terms of any future or present purchase order submitted by Customer shall be void.

f. This Agreement may not be waived, altered, or modified, except by a writing signed by an authorized representative of Telenet and Customer. No agent, employee or representative of Telenet or Customer has any authority to bind Telenet or Customer to any affirmation, representation or warranty unless such is specifically included in this written Agreement.

g. This Agreement shall be governed by the laws of the Commonwealth of Virginia. If any provision or provisions of this Agreement shall be held to be invalid, illegal, or unenforceable, the validity, legality, and enforceability of the remaining provisions shall not be in any way affected or impaired thereby.

h. The Parties' remedies in this Agreement are exclusive.

Telenet is a registered trademark of Telenet Communications Corporation.

IBM INFORMATION NETWORK
P.O. Box 30104
Tampa, FL 33630-9948
(813) 878-4374

Total EDI Revenue, Fiscal Year End 12/31/89: $12,500,000

The Company

The Information Network was formed in 1982 as an independent business unit within IBM, offering SNA networking and remote processing services.

It was upgraded in 1985 with new computer center facilities, and other measures designed to improve large users' abilitites to connect their own SNA networks and to link with other customers.

EDI Offering

IBM Information Network (IBM IN) is a full service vendor of EDI services including hardware, software, network services, and professional services.

Transmission Services

IBM Information Network supports two basic services:

- Network Services, for linking a customer's mainframes and terminals in a managed SNA network environment.
- Information Exchange, which provides "store and forward" and other value-added services, including EDI.

EDI Software

IBM launched its expEDIte series of translation and communication software in April, 1989.

"DataInterchange Series" translation software packages are available for mainframes, mid-range, and micro computers.

"Communicator Series" telecommunication software works in conjunction with the translators to connect only to IBM's Information Network.

Data Interchange products do not require the Communicator

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software.

IBM's EDI software runs on OS/2, System/3X, AS/400 and MVS operating systems.

IBM manufactures the mainframe and micro translators. Its mid-range translators are made by ACS Network Systems (Concord, CA) and sold under the IBM label.

Consulting

IBM's Systems Integration division offers custom consulting to customers.

Also, its "QuickEDI" program is a comprehensive package for small "spoke" companies to implement EDI with a large "hub" company. IBM installs PC software with the hub company's technical requirements (for communications, transaction sets, product codes, etc.) already programmed. Annual maintenance is also included.

Education and Training

IBM's Systems Integration and Professional Services group (based in Dallas, TX) provides two-day long educational seminars on EDI.

Costs for the seminars are $550 per attendee.

Also, IBM Information Network offers trading partner conferences to help customers bring up trading partners.

Sales and Service Locations

IBM maintains over 400 sales office around the United States. Immediate customer support for EDI is available through these offices.

However, IBM divides the U.S. into twelve areas, each with its central "area city" that houses a team of specialists. IBM has placed 30 EDI specialists throughout its area cities.

IBM Information Network support also includes customer assistance. A local "help desk" is available in 21 countries with customer assistance operators ready to assist customers in their native language.

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User Start Up Procedures

With its QuickEDI program, IBM delivers translation software for PC-using customers with a trading partner's profile already programmed in it (addresses, data formats, product codes, etc.). The software also has passwords and user identification numbers to automatically log onto the IBM network. Thus, the customer can be on the network on its own in one day.

For mainframe based customers, time is needed to install the translation software and integrate with other applications. But initiating with a trading partner requires the exchange of network addresses, transaction set (data format) types, and other special codes such as product codes, that are used in the data formats.

Customer Base

User Characteristics

Users of the Information Network include chemical and pharmaceutical companies, textile manufacturers, automakers, medical insurance carriers, and electronics firms.

Key Users

Not available.

Marketing

EDI at IBM is centered in the EDI Solutions Center in Tampa, FL. It is part of IBM's Applications Solutions division. The EDI Solutions Center has about 30 full time staff. For professional consulting projects, however, experts in particular application domains (e.g. accounting, manufacturing, etc.) will be called in on the job.

Market Share

INPUT estimates that IBM Information Network's market share of the EDI network services market to be four percent in 1989.

Profit Centers

Information Network for EDI transmissions. This has been the primary profit center since IBM began offering EDI services on its network. Revenue for 1989 was approximately $12 million, double what it was in 1988.

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Data Interchange EDI Software. The first IBM products from this group were shipped in late third quarter 1989. INPUT estimates revenues to be $500,000.

Systems Integration and Professional Services. IBM offers two-day seminars and on-site consulting. The program was just launched this year and has not yet garnered significant revenues.

Liability for Lost Data

From IBM's standard agreement with Information Network customers:

"You release IBM from all liability for the loss or alteration of your programs or data or their acquisition by another party, except for IBM's failure to implement those aspects of the security procedures which are under IBM's control."

"IBM will not be responsible for transmission errors, corruption of data or for the security of data during transmission via public telecommunications facilities."

Pricing

Information Network fees vary according to services provided.

Charges fall basically into three categories: (1) monthly base fee per corporate account (covers any number of mailboxes); (2) connection charge (either a flat rate for a leased line or a connect-time rate for dial-up connection); (3) usage charge based on message units transmitted.

Technology

Network Configuration

North America: IBM has 21 major node sites for the U.S. portion of its network. It has 286 local access points for dial-up service in the U.S.

Worldwide: The network provides local access points in Austria, Belgium, Canada, Denmark, Finland, France, Germany, Hong Kong, Ireland, Italy, Japan, Luxembourg, The Netherlands, Norway, Spain, Sweden, Switzerland, and the United Kingdom.

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Interconnection Arrangements

North America: For EDI services, the IBM Network is interconnected with Control Data Corporation (Redi*Net), CompuServe, Sterling Software (Ordernet), GEIS, Sears Communication Corporation, Telecom Canada, Transettlements, Harbinger, Kleinschmidt, and BT Tymnet.

The EDI interconnections are believed to use the 3270 protocol.

In 1989, IBM agreed to connect its network with eight other commercial networks via X.400 to provide E-mail services. The interconnection service is made available for targetted industry groups. The aerospace and oil industries are the first industry groups using the interconnections. The other networks are AT&T Mail, Dialcom Inc. (now, BT Tymnet), GEIS Quickcomm, MCI Mail, Telenet Telemail, Tymnet (now BT Tymnet), and Western Union.

Worldwide: The IBM network connects through local PTTs in 53 other countries throughout Latin America, the Caribbean, East Asia, Oceania, Africa, and the Middle East. It has no connections in East Bloc countries, the USSR, or India.

Protocols Supported

IBM's goal is to connect any kind of computer with any other kind. To date, most major protocols are supported.

The network was initially offered to connect IBM computers using the SNA protocol and therefore has a strong bias toward promoting SNA.

IBM's expEDIte family of software products connect to the IBM network with an SNA protocol. The Network, however, supports other protocols such as 3270, 3780. In many foreign countries, the network is reachable via the local PTT using an X.25 protocol.

Protocol conversion is a service offered on the network.

Protocol Support Plans

IBM has agreed to use X.400 for interconnecting with other networks. Otherwise, IBM has not announced an intention to change its current protocol support offering.

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EDI Formats Supported

The network supports ANSI X12, Edifact, TDCC, and UCS EDI data formats.

EDI and ISDN

IBM Information Network has made no strategic announcement concerning ISDN.

It has been involved in two pilot tests of ISDN. One test was with GTE and the other, still in progress, is with U.S. West. The U.S. West pilot involves wiring home residences with ISDN capacities.

Sources of Technology

IBM is the source of all of its technology for EDI services except for the translation software for the System /3x and AS/400 series, which is made by ACS Network Systems (Concord, CA).

Switching Systems

Hardware: For concentrators/mulitplexors, IBM uses its Serie One and 3745 equipment.

Software: IBM NCP (network control planning)

Data Format Translation

IBM provides on-network translation (in the network host). It encourages its customers, however, to enact translation on the customer cpu.

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Strategies and Alliances

IBM wants to position itself as a major EDI player and sees EDI as a strategic product offering.

It characterizes EDI as one of three major "inter-organizational systems" that it expects will become key systems/applications in the 1990s. These are electronic mail systems, online transaction processing systems, and EDI.

Interorganizational systems were originally given analysis by Harvard academicians. IBM sees these systems as central applications for the 1990s.

IBM is in a good position in that it offers to the EDI customer hardware, software, a network and professional services.

Its SNA protocol is already well established in intra-corporate terminal-to-mainframe networks. And it is used more and more for data communications over public networks.

In October, 1989, IBM launched an EDI/EFT payment service in conjunction with First National Bank of Chicago called PayStream. Companies can transmit payment instructions to First Chicago through the IBM Information Network. First Chicago acts on these instructions by sending electronic payments to each supplier's account at its bank or, if the supplier's bank does not have the capability to receive an electronic payment, by sending a check.

IBM has set the highly ambitious objective of gaining 6,500 new EDI customers to its network in the year 1990. (The leading EDI VAN, GEIS, maintains approximately 7,000 EDI customers total.)

IBM wants to go after large corporations who are already doing EDI but are dissatisfied with either their EDI software or network services.

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IBM Information Network
P.O. Box 30104
Tampa, FL. 33630-3104

March 6, 1990

International Business Machines Corporation

Armonk, New York 10504

EXHIBIT
General Schedule of Charges
IBM Information Network Agreement

Charges effective
July 1, 1990
unless otherwise noted

Form No.: Z125-4186-04
Exhibit No.: INGS-10
March 6, 1990

This Exhibit applies to services in general.

Service-specific charges are explained on an Exhibit for that Service.

The IBM Information Network is generally available 24 hours-a-day, seven days-a-week. IBM reserves the right to schedule reasonable hours for maintenance or system changes at IBM's discretion.

Nonprime charges apply to sessions that begin and end between 8 p.m. and 8 a.m. (Eastern time), Monday through Friday, on weekends and on specified national holidays. If any part of a session occurs during prime time, then prime rates are charged in all cases, except for network traffic and dial access charges. The actual time of day determines the rate for network traffic and dial access charges. One physical session may be divided into two or more billing sessions if a prime time boundary is crossed.

Each session within a physical dial connection is billed separately.

1. Usage charges

	Prime time	Nonprime time
Local dial access - class "A" city*	$ 6.17 per hour per session	$ 3.07 per hour per session
Local dial access - class "B" city* *See your IBM Information Network marketing representative for a list of class A and B cities.	$ 9.08 per hour per session	$ 4.52 per hour per session
800 number dial access surcharge	$ 10.75 per hour per session surcharge to local dial access - class "A" city	
Secondary node access	$ 20.91 per hour	$15.26 per hour
Dedicated dial port	$1,167.00 per port per month	

2. Other charges

Tape load to IBM	$ 46.00 each
Tape load from IBM	$ 95.00 each
Data recovery	$ 62.00 each
User ID (Computing Services and SA IDs)	$ 3.01 per month per user ID
You may use one user ID to access multiple Services; however, you may access only one Service at a time. IBM will base the monthly user ID charge on the maximum number of Computing Services user IDs including any Service Administrator (SA) user IDs recorded per account ID within a calendar month. IBM will assign additional user IDs as soon as possible after your request. IBM will record a reduction in user IDs five working days following receipt of your notification.	
Enrollment charge	$194.00 each activity account; one-time charge
Base charge All other charges are added to the base charge.	$ 51.00 per month per invoiced account
Billing extract IBM will deliver the extract once each month. IBM may add data values to the extract without advanced notice if the additional values do not change the size of any data field or modify the record formats.	$ 303.00 per each delivered extract

3. Network-attachment Workstation Licensed Program charges

The following licensed programs and their associated charges are listed here for your information and convenience. They are licensed under the licensing agreements noted. They are not licensed under the IBM Information Network Agreement.

Program name	Charges
IBM 3101 Character Mode Emulator Licensed under the IBM Program License Agreement.	$97.00 per licensed copy
IBM Information Network Personal Connectivity Service (INPCS) - Entry* *Licensed under the IBM License Agreement, IBM Information Services, Information Network and its applicable Supplement for IBM Information Network Personal Connectivity Service. Quantity discounts are available under the same Supplement.	$165.00 per licensed copy A registration fee of $59.00 is charged for the first order placed under the applicable Supplement.

Under the Enhanced Connectivity Service option, IBM provides communication lines, modems and the IBM Information Network communication controller port to enable access from your designated location(s) to the IBM Information Network. For each communication line, IBM will install a modem at the appropriate IBM location and deliver a modem to your designated location(s). You will install modems at your locations according to IBM-prescribed procedures. You agree to provide a suitable environment for the modems located on your premises, as specified in the applicable installation manual. Title to the modems remains with IBM.

Under the Standard Connectivity Service option, IBM provides communication lines to enable access from your designated location(s) to the IBM Information Network. You provide the appropriate modems at IBM locations and your locations. For each communication line, IBM provides the IBM Information Network communication controller port.

Under the Alternate Connectivity Service option, you provide communication lines to enable access from your designated location(s) to the IBM Information Network. You will provide the appropriate modems at IBM and your locations. For each communication line, IBM will provide the IBM Information Network communication controller port.

Under the Enhanced and Standard Connectivity Service options, IBM invoices you for the following:

1. common carrier recovery charges (monthly and installation)
2. Connectivity Service charges (monthly and installation and/or conversion).

The Common Carrier recovery charges consist of monthly leased line charges, including any taxes, franchise fees or credits, plus any installation charges as IBM receives them from the common carrier. For any month in which IBM does not receive an invoice from the common carrier in time to invoice you in the current billing period, IBM invoices you an estimated charge based on billing history. IBM will make adjustments to common carrier charges as it receives the actual charges. IBM will invoice you common carrier charges for cancellations after it has received such charges.

1. **Connectivity Service monthly charges**

	Enhanced	Standard	Alternate
Point-to-point or the first point on a multi-point line. Data rates of 2,400 bps, 4,800 bps, or 9,600 bps.	$ 1,109.00	$ 890.00	$ 690.00
Point-to-point or the first point on a multi-point line. Data rate of 14,400 bps.	$1,763.00	$1,399.00	$1,145.00
Point-to-point or the first point on a multi-point line. Data rate of 56,000 bps.	$4,439.00	$4,366.00	$3,783.00
Each subsequent point on a line with data rates of 2,400 bps, 4,800 bps, or 9,600 bps.	$ 218.00	$ 108.00	No charge
Each subsequent point on a line with a data rate of 14,400 bps.	$ 308.00	$ 127.00	No charge
Each subsequent point on a line with a data rate of 56,000 bps.	$ 327.00	$ 290.00	No charge

Connectivity Service monthly charges, for all options, cover the dedicated leased-line port on the IBM Information Network communication controller and the IBM Information Network support and administrative charges. Connectivity Service monthly charges for the Enhanced Option include management of the line and the IBM-provided modems. Connectivity Service monthly charges for the Standard Option include management of the line and vendor contact regarding service of modems you provide. You assume all risks and liabilities associated with any modems you provide. You will pay all maintenance and repair charges directly to the modem vendor. Access to your equipment or facilities that are located on IBM premises is generally available during normal business hours at that location.

2. Connectivity Service installation charges

	Enhanced	Standard	Alternate
Point-to-point or the first point on an analog or digital multi-point line; 2,400 4,800 or 9,600 bps.	$1,045.00	$ 605.00	$ 550.00
Point-to-point or the first point on a multipoint analog line; 14,400 bps.			
Point-to-point or the first point on a multipoint digital line; 56,000 bps.			
Each subsequent point on a digital or analog multipoint line; 2,400, 4,800, 9,600, 14,400 or 56,000 bps.	$660.00	$440.00	$385.00

Connectivity Service installation charges cover port configuration, as well as ordering, registering, installing and testing of the leased line and associated modem(s), as appropriate under the particular Connectivity Service option.

Connectivity Service installation charges are due upon acceptance of your order and payable upon installation or cancellation of the order.

Installation charges apply to all line installations, moves, and changes not covered under conversion charges below.

3. Connectivity Service conversion charges

Point-to-point or the first point on a line:	
Alternate to Enhanced	$495.00
Alternate to Standard	$220.00
Standard to Enhanced	$275.00
Modem speed change (analog line)	$275.00

Each subsequent point on a multi-point line:	
Alternate to Enhanced	$275.00
Alternate to Standard	$165.00
Standard to Enhanced	$110.00
Modem speed change (analog line)	$110.00

Connectivity Service conversion charges cover port reconfiguration, as well as ordering, registration, installation, and testing activity, as appropriate for the particular conversion.

Connectivity Service installation charges are due upon acceptance of your conversion order and payable upon completion or cancellation of the conversion.

AS/400 Communication Service (Availability of this service is planned for April 3, 1990)

Under AS/400 Communication Service, IBM provides communication lines, modems and the IBM Information Network communication controller port to enable access from your designated location(s) to the IBM Information Network. For each communication line, IBM will install a modem at the appropriate IBM location and deliver a modem to your designated location(s). You will install modems at your locations according to IBM-prescribed procedures. You agree to provide a suitable environment for the modems located on your premises, as specified in the applicable installation manual. Title to the modems remains with IBM.

Under AS/400 Communication Service, IBM invoices you for the following:

1. common carrier recovery charges (monthly and installation)
2. AS/400 Communication Service charges (monthly and installation and/or conversion).

The common carrier recovery charges consist of monthly leased line charges, including any taxes, franchise fees or credits, plus any installation charges as IBM receives them from the common carrier. For any month in which IBM does not receive an invoice from the common carrier in time to invoice you in the current billing period, IBM invoices you an estimated charge based on billing history. IBM will make adjustments to common carrier charges as it receives the actual charges. IBM will invoice you common carrier charges for cancellations after it has received such charges.

1. **AS/400 Communication Service monthly charges**

	Charges
AS/400 network connection for point-to-point or multi-point line with a data rate of 9,600 bps.	$ 682.00
AS/400 network connection for point-to-point or multi-point line with a data rate of 14,400 bps.	$1,111.00
AS/400 network connection for point-to-point or multi-point line with a data rate of 56,000 bps.	$3,355.00
Each AS/400 site attached to a network connection on a line with a data rate of 9,600 bps.	$ 292.00
Each AS/400 site attached to a network connection on a line with a data rate of 14,400 bps.	$ 418.00
Each AS/400 site attached to a network connection on a line with a data rate of 56,000 bps.	$ 473.00

AS/400 Communication Service monthly charges, for all options, cover the dedicated leased-line port on the IBM Information Network communication controller and the IBM Information Network support and administrative charges. AS/400 Communication Service monthly charges include management of the line and the IBM-provided modems.

AS/400 Communication Service also covers traffic for sessions normally charged under Network Services for each AS/400 site.

2. **AS/400 Communication Service installation charges**

	Charges
AS/400 network connection for a point-to-point or multi-point line:	$ 385.00
Each AS/400 site attached to a network connection	$ 660.00

AS/400 Communication Service installation charges cover port configuration, as well as ordering, registration, installing and testing of the leased line and associated modem(s) as appropriate.

AS/400 Communication Service installation charges are due and payable upon IBM's acceptance of your installation or change order. Installation charges apply to all line installations, moves, and changes not covered under conversion charges below.

3. AS/400 Communication Service conversion charges

AS/400 network connection for point-to-point or multi-point line:	Charges
Modem speed change (analog line)	$275.00

Each AS/400 site attached to a network connection:	Charges
Modem speed change (analog line)	$110.00

AS/400 Communication Service conversion charges cover port reconfiguration, as well as ordering, registration, installation, and testing activity, as appropriate for the particular conversion.

AS/400 Communication Service conversion charges are due and payable upon IBM's acceptance of your conversion order.

Connectivity Service and AS/400 Communication Service

For billing purposes, IBM will discontinue your attachment one month following receipt of your notification, or on the date you requested, whichever is later.

IBM-provided modems

- The term "modem" means modem and/or DSU/CSU, as appropriate.
- IBM will pay shipping charges, if any, for each modem.
- Each modem will be in good working order at the time of installation and will conform to the IBM Information Network's attachment specifications. The operation of the modem may not be uninterrupted or error free.
- IBM will perform communication line and modem problem determination. In addition, IBM will provide maintenance service to keep each modem in, or restore it to, good working order and will make all necessary adjustments, repairs and parts replacements. For this purpose, IBM shall have full and free access to its modems located at your designated location(s).
- You will be responsible for loss of, or damage to, a modem caused by use of the modem for other than the purpose specifically stated in this Exhibit.
- During the period a modem is in transit or in your possession, IBM relieves you of responsibility for all risks of loss of, or damage to, the modem, except for loss or damage:
  1. Caused by nuclear reaction, nuclear radiation or radioactive contamination for which you are legally liable;
  2. Caused by your failure to comply with the obligations stated in this Exhibit.
- You may not sublet, assign or transfer the modems without IBM's prior written consent.

Customer-provided modems (Connectivity Service only)

- Under the Standard Connectivity Service option, IBM will perform the following upon your request:
  1. Determine whether the modem which you select meets IBM Information Network interface specifications;
  2. Perform problem determination, including vendor contact regarding service, as appropriate.
- Under the Standard Connectivity Service option, you:
  1. Assume all risks and liabilities for costs and performance associated with your modems, maintenance and repair;
  2. Pay all modem, maintenance and repair charges directly to the vendor.
- Under the Alternate Connectivity Service option, you assume all responsibilities regarding communication lines and modems. IBM will assist in initial problem determination only.

IBM Information Network
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March 6, 1990

International Business Machines Corporation

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EXHIBIT
Computing Services Schedule of Charges
IBM Information Network Agreement

Charges effective
July 1, 1990
unless otherwise noted

Form No.: Z125-4184-02
Exhibit No.: INCS-08
March 6, 1990

This Exhibit applies to the following IBM Information Network Services: MVS Productivity System and VM Productivity System.

1. Processing charges

	Prime time	Nonprime time
Computer Resource Unit (CRU) CRU is a measure of computing resource utilization and consists of CPU seconds and input/output operations.	$ .057 per CRU	$ .029 per CRU
Network Resource Unit (NRU) NRU is a measure of network resource utilization and consists of network input/output operations.	$ .03 per NRU	$ .02 per NRU

2. Storage charges

Allocated DASD	$1.67 per megabyte per day
Online Disk Facility-VM	$ .002 per megabyte per minute

3. DASD storage minimums

MVSPS	5 megabytes per account ID
VMPS	1 megabyte

13C

DASD storage minimums (continued)

VMPS Features					
CMS	PROFS	VM/SQL	VM/SQL Data Base Virtual Machine	Shared PROFS	Online Disk Facility
1 MB per user ID	1 MB per user ID 25 MB per account ID, for 4 ID's for system functions	3 MB per user ID 79 MB per account ID	The account user ID for the account data base machine requires the following minimum minimum DASD: 191 disk-9 MB 195 disk-11 MB 200 disk-24 MB 201 disk-9 MB 202 disk-26 MB (202 disk size-85 MB if SQL/DS starter system is to be used).	1 MB per user ID	Available in sizes of 1, 2, 5, 10, 20, 25, 35, and 50 megabytes

Note: IBM will increase allocated storage as soon as practical after your request. IBM will bill you at the new rate on the day following availability of the increased storage, or on the date you requested, whichever is later. IBM requires five working days' notice to decrease storage. For direct access storage, if you do not reduce your files to fit within the decreased allocation within five working days of such notice, IBM may require another notice period.

4. Special products

MVS Productivity System (MVSPS)	(Processing charges for MVSPS also apply)
Information/Library II	$4.41 per session IBM will apply CRU rates to all Information/ Library II usage. For orders solely for Information/Library II, no prerequisite storage minimums apply. Information/Library II is provided for use within your own business enterprise. You agree that you will allow access to Information/ Libary II only to your employees or IBM employees.
CICS monthly charge	$746.00 per month CICS address space terminal access charge is in addition to other access charges. IBM will apply CRU rates to all CICS usage including CICS administrator usage. IBM will discontinue CICS charges five working days following receipt of your notification.
Office Systems feature of CICS	$2,063.00 per month
CICS connect time	$ 6.75 per hour

VM Productivity System (VMPS)	(Processing charges for VMPS also apply)
PROFS Personal Computer Support	$ .13 per refresh of mail at PC or at host IBM charges for the PROFS PC support based on usage of the feature. There is a charge of $0.13 every time PROFS mail is refreshed at the PC or sent back to the host from the PC. If the PROFS PC support is not used, there is no charge. The use of PROFS and SHARED PROFS is subject to the terms and conditions of the supplement PROFS Version 2 and PASF access.

Application System (AS) is provided as a standard feature of VMPS. Normal VMPS processing and storage charges apply.

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March 6, 1990

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EXHIBIT
IBM Intercontinental Information Services Schedule of Charges
IBM Information Network Agreement

Charges effective
July 1, 1990
unless otherwise noted

Form No.: Z125-4242-05
Exhibit No.: INIC-10
March 6, 1990

This Exhibit applies to IBM Intercontinental Information Services.

IBM will provide a communications link to enable you to access and use the services provided by the IBM Information Network in countries outside the United States.

All use of the IBM Information Network will be subject to the security procedures established by the respective country. IBM will provide a copy of these procedures to you upon request.

The Services available are: International Network Services; Time Sharing Option (TSO); Multiple Virtual Storage (MVS) Batch using TSO; Remote Job Entry (RJE); PROFS-to-PROFS; International Business Service Data Transfer Service (IDTS); and Screenmail.

International Network Services: International Network Services are provided by the IBM Information Network in the United States and by the IBM Information Network in countries where the service is available.

Single logon service facilities require users to log on only once to the IBM Information Network Service Manager in the originating country.

The product access authorization function is performed using the Service Manager of the country where the user logs on to the network. The Product Administrator function can be managed by a Customer authorized representative in each country, or the Customer in the United States may obtain user IDs on the appropriate country IBM Information Network Service Manager(s).

The monthly charges for International Network Services include connectivity and network traffic in each country where the service is being delivered. Network traffic incurred using single logon facilities is accumulated under one user ID. In addition, international network traffic is charged for traffic that crosses an international border.

TSO and MVS Batch: The monthly charges for use of the TSO, RJE, and MVS Batch Services will be the total of processing, storage and international network traffic charges.

PROFS-to-PROFS: The monthly charges for the transportation of notes and documents from U.S. IBM Information Network PROFS users to the users of PROFS on the Zoetermeer IBM Information Network will consist of international network traffic charges as shown on this Exhibit.

IDTS: IDTS provides data transfer capabilities between country computing centers as an extension of the MVS Productivity System (MVSPS). The monthly charges for the transportation of data files using IDTS will consist of international network traffic charges.

IDTS does not provide any mechanism for preventing file access after issuing the IDTS service request. You may access and update the file before, and during, actual data transfer. You are responsible for data integrity within the IDTS service environment.

Screenmail: The monthly charges for Screenmail include monthly mailbox charges, distribution charges and storage charges in addition to network traffic charges as shown on the Network Services Schedule of Charges Exhibit. You do not incur international network traffic charges for Screenmail.

Note: International network traffic charges are only for the transmission of data from the U.S. IBM Information Network processing center to the destination country. Charges to create the data on the U.S. IBM Information Network are subject to the charges associated with the Service being used, as described in the appropriate Exhibit(s).

Monthly charges

	TSO	MVS Batch
Processing units	$1.25 per unit	$1.17 per unit
A processing unit is a pricing component that consists of the following: a. Computer Resource Units (CRUs) which measure computing resource utilization and consist of CPU seconds and input/output operations b. Network Resource Units (NRUs) which measure network resource utilization and consist of network input/output operations c. Workspace which is reserved for each user ID recorded in the user profile d. Other cost elements such as user ID, tape load to and from IBM, data recovery and printing.		
Online storage	$2.37 per MB per day allocated	$2.37 per MB per day allocated
International network traffic, per 1,000 characters		$ .029
International network traffic, per 1,000 characters to Japan		$ .088
International IE characters, per 1,000 characters		$ .029
International IE characters, per 1,000 characters to Japan		$ .088

Screenmail	Charges
Mailbox Initial registration Monthly charge	 $85.00 per mailbox $29.00 per mailbox
Usage charges for distribution unit National distributions International distributions A distribution unit consists of 4,000 characters distributed to one destination	 $ .22 per unit $ .37 per unit
Storage units (2,000 characters) per month	$ .22 per unit
You also incur network traffic charges, as shown on the Network Services Schedule of Charges Exhibit, and connectivity charges for sending and receiving a Screenmail document. Screenmail Service scheduled availability hours are midnight to 10 p.m. U.S. Eastern time, Monday through Sunday.	

Schedule of service availability

Service hours in Zoetermeer, The Netherlands, are generally 24 hours-a-day, seven days-a-week, except during scheduled maintenance from 6 p.m. to 6:30 p.m., Eastern time, every Tuesday.

The scheduled availability of Network Services in the United States and Japan is as follows (all hours are Eastern time):

Monday-Tuesday:	Midnight to 2 p.m., 4 p.m. to Midnight	Saturday:	Midnight to 3 a.m., 4 p.m. to Midnight
Wednesday:	Midnight to 1 a.m., 2 a.m. to 2 p.m., 4 p.m. to Midnight	Sunday:	Midnight to 3 a.m., 5 p.m. to Midnight
Thursday-Friday:	Midnight to 3 a.m., 4 p.m. to Midnight		

Some periods of unattended service are covered on a call-out basis on Friday, Saturday, and Sunday nights. Additional planned maintenance schedules are available from the online NEWS facility.

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Exhibit

March 6, 1990

International Business Machines Corporation

Armonk, New York 10504

EXHIBIT
Network Services Schedule of Charges
IBM Information Network Agreement

Charges effective
July 1, 1990
unless otherwise noted

Form No.: Z125-4241-07
Exhibit No.: INNS-12
March 6, 1990

This Exhibit applies to the following service: connection of customer networks, host computer systems, and computer terminals to the IBM Information Network for terminal-to-computer and computer-to-computer data communications.

1. Monthly charges

	SNA Network Interconnection	BSC Emulation *
Host administration	$482.00 per account	$318.00 per connection

Host administration charges cover problem and change control as it relates to the network interface, standard network reports and administrative services.

The monthly Systems Network Architecture (SNA) Network Interconnection host administration charge applies to networks directly connected to the IBM Information Network. The SNA Network Interconnection charge applies to the first network connection per account. Additional network connections or multiple IBM Information Network connections (NETIDs) to your network for the same account do not incur monthly host administration charges. However, all appropriate line charges apply. A network may, or may not, have terminals attached that are defined to the IBM Information Network.

The monthly Binary Synchronous Communication (BSC) Emulation host administration charge applies to hosts connected via the IBM Information Network BSC 3270 Emulation interface. The BSC Emulation charge applies to each connection. Multiple connections to the same host will incur multiple host administration charges.

For billing purposes, IBM will discontinue your attachment one month following receipt of your notification, or on the date you requested, whichever is later.

* Withdrawn from marketing effective 6/21/89; withdrawal effective 8/1/90.

2. Usage charges

Network traffic per 1,000 characters	SNA Network Interconnection	BSC Emulation *
A minimum traffic count of 1,000 characters applies to all Network Services sessions. The network traffic count includes SNA overhead characters.		
Prime time	$ .031	$ .098
Non-prime time	$ .015	$ .04

3. One-time charges

Installation charges	SNA Network Interconnection
Installation charges include the planning and testing for your network or your NETID connection. A network connection can support one or more of your hosts. A network may, or may not, have terminals attached which are defined to the IBM Information Network. Multiple IBM Information Network connections to different IBM Information Network gateways by your same SNA network identification incur additional connection installation charges. Additional NETIDs requiring definition for your single network are considered additional connections and will be charged accordingly. A transmission group is considered a single connection for the purpose of installation charges.	
First connection	$1,609.00 per connection
Additional connection (same network interface)	$ 804.00 per connection
Attached network resource registration	$ 40.00 per device

Your enterprise may use Cascaded or Hub Null Network configurations to attach multiple SNA networks to the IBM Information Network through a single communications link. In these configurations, users in your networks not adjacent to the IBM Information Network may experience different levels of availability and response time.

In addition, your help desk may be required to work with the IBM Information Network to resolve connectivity related problems. The IBM Information Network can only determine and resolve connectivity issues up to the adjacent network. The IBM Information Network will work with the help desk in your attached network configuration to assist in resolving communication or connectivity related problems that occur beyond the IBM Information Network connection.

All resources you define to your serial or Cascaded and Hub Null Network configurations must be within your enterprise.

* Withdrawn from marketing 6/21/89; withdrawal effective 8/1/90.

IBM Information Network
P.O. Box 30104
Tampa, FL 33630-3104

March 6, 1990

International Business Machines Corporation

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EXHIBIT
IBM Application Services Schedule of Charges
IBM Information Network Agreement

Charges effective
July 1, 1990
Unless otherwise noted

Form No.: Z125-4374-01
Exhibit No.: INAS-01
March 6, 1990

This Exhibit applies to the following services: IBM Expedite/MAIL, IBM Information Exchange, RSVSF, and LU 6.2 Inter-Operational Test Service.

IBM Expedite/MAIL

1. Variable charges (PROFS, Shared PROFS, CMS, TSO, and IE)

	Charges
First message segment (0-4,000 characters)	$ .61
Each additional segment (0-4,000 characters)	$ .33

2. Fixed monthly charges (DISOSS only)

	Monthly charges
IBM Expedite/MAIL - Node Access Maximum of three DISOSS nodes per account	$ 462.00 per node

Users who access IBM Expedite/MAIL from the IBM Information Exchange or Shared PROFS services are subject to the above appropriate charges in addition to any other charges.

IBM Information Exchange

IBM Information Exchange charges, whether prime or nonprime, are based upon the single time stamp in the send or receive message.

1. Monthly charges

	Prime time	Nonprime time
The following processing charges are for the computer resources consumed while using the IBM Information Exchange (IE) Service. These charges are applied to each IE message as it is received and as it is sent.		
IBM Information Exchange message, each	$ .36	$ .18

	Prime time	Nonprime time
IE characters, per 1,000 characters The IE character charge is for use of network resources and is applied to each 1,000 characters sent to or from IBM Information Exchange.	$ .085	$ .042

	Prime time	Nonprime time
Dial access, per 1,000 characters		
IBM Information Network node - class "A" city	$ .031	$ .015
IBM Information Network node - class "B" city	$ .048	$ .024
Secondary node access	$ .119	$ .087
800 number dial access surcharge	$ .054 per 1,000 character surcharge to local dial access class "A" city	
Dial access can be either direct to an IBM Information Network node or through a secondary node (secondary network). Only one of these charges applies during a dial session. The dial access charge is applied to each 1,000 characters sent to or from Information Exchange. The 800 number access surcharge is an additional charge.		

	Charges
Archiving, optional Short-term, 1 to 30 days	$ 5.15 per million characters per day

Batch Data Interface

You can use the Batch Data Interface capability to access IBM Information Exchange from remote-entry workstations and from IBM Information Network Productivity Systems. Charges for use of these systems are listed in the Computing Services Schedule of Charges Exhibit. IBM will charge communication with IBM Information Exchange at the rates contained in this Exhibit. IBM Information Exchange message charges will result from placing messages in IBM Information Exchange using this interface.

2. General considerations for IBM Information Exchange charges

   a. Message headers are not included in the length of the message to be invoiced for Information Exchange characters and dial access.

   b. Network connect time through the service manager for Information Exchange is not invoiced.

   c. User IDs that only have Information Exchange or NS products available are not invoiced the user ID charge.

   d. There is no charge for requesting messages when the mailbox is empty.

   e. There is no charge for retransmissions at the Information Exchange application protocol level (for example, data resent during restart/recovery) or retransmissions at the communication level.

   f. All messages sent are charged, regardless of whether or not they are received.

   g. When a message is sent to a list of users, the send-side charges may exceed the published rates. These differences are due to roundings during the calculation of charges. A proportional charge is calculated for each receiver on the list and rounded to the nearest cent. The sum of these proportional charges is the total send-side charge billed. For example, a message sent to four users would incur the following charges:

      - one quarter of the message charge, rounded to the nearest cent, times four
      - one quarter of the Information Exchange character charge, rounded to the nearest cent, times four
      - if sender used a dial port, one quarter of the dial port charge, rounded to the nearest cent, times four.

      If the receivers pay the send-side charges, then each receiver would pay one quarter of the total send-side charge. In addition, users also pay their own receive charges.

3. **IBM Information Exchange Interface Licensed Program charges** (Effective March 6, 1990)

The following licensed programs and their associated charges are listed here for your information and convenience. They are licensed under the licensing agreements noted. They are not licensed under the IBM Information Network Agreement.

Program name	Charges
IBM expEDIte/MVS Host Host program licensed under the Agreement for IBM Licensed Programs. IBM provides a two-month testing period for the program. The per-month charge does not apply if you have previously paid a one-time charge for the program.	$34.00 per month
IBM expEDIte/CICS Host program licensed under the Agreement for IBM Licensed Programs. IBM provides a two-month testing period for the program.	$99.00 per month
Upgrade charge, for customers who have PC/IE, Version 1, to migrate to IBM expEDIte/PC.	$59.00 per upgrade license (not subject to discount) Amendment to IBM Program License Agreement (Customer Redistribution) or IBM Personal Computer Licensed Program Redistribution Agreement. $4,546.00 upgrade charge per application
IBM expEDIte/PC Electronic Data Interchange workstation program licensed under the IBM Program License Agreement. IBM provides a one-month testing period for the program. Charges under the Redistribution Agreement are not refundable.	$180.00 Per licensed copy, machine-readable format Amendment to IBM Program License Agreement (Customer Redistribution) or IBM Personal Computer Licensed Program Redistribution Agreement $ 121.00 One-time registration $13,642.00 Per application
IBM expEDIte/PC Base Workstation program licensed under the IBM Program License Agreement. IBM provides a one-month testing period for the program. Charges under the Redistribution Agreement are not refundable.	$121.00 Per licensed copy machine-readable format Amendment to IBM Program License Agreement (Customer Redistribution) or IBM Personal Computer Licensed Program Redistribution Agreement. $ 121.00 One-time registration $9,095.00 Per application
IBM expEDIte/36, IBM expEDIte 400, IBM expEDIte 400 Base Mid-range system programs licensed under the Agreement for IBM Licensed Programs. IBM provides a one-month testing period for these programs.	See quantity order discount schedule for prices.
IBM expEDIte OS/2 Base A workstation program licensed under the IBM Program License Agreement. IBM provides a one-month testing period for the program.	See quantity order discount schedule for prices.
Upgrade charge for customers who have IBM expEDIte 400 Base, to migrate to IBM expEDIte 400.	$110.00 Per upgrade license (not subject to discount)

IBM Information Exchange Interface Licensed Program charges (Effective March 6, 1990) (continued)

Licensed Program, Quantity Order Discounts

Machine readable format only	Order Quantity	Discount %	Unit Price Per Licensed Copy
IBM expEDIte/PC	1-19	0	$180.00
	20-49	12	159.00
	50-149	16	152.00
	150-249	20	144.00
	250-499	24	137.00
	500-999	27	132.00
	1000+	30	126.00
IBM expEDIte/PC Base	1-19	0	$121.00
	20-49	12	106.00
	50-149	16	102.00
	150-249	20	97.00
	250-499	24	92.00
	500-999	27	88.00
	1000+	30	85.00
IBM expEDIte OS/2 BASE	1-19	0	$275.00
	20-49	12	242.00
	50-149	16	231.00
	150-249	20	220.00
	250-499	24	209.00
	500-999	27	201.00
	1000+	30	193.00
IBM expEDIte/36	1-6	0	$211.00
	7-9	12	186.00
	10-14	16	177.00
	15-19	21	167.00
	20-24	27	154.00
	25-49	33	142.00
	50-99	34	139.00
	100+	36	135.00
IBM expEDIte 400 BASE	1-3	0	$330.00
	4-5	6	310.00
	6-9	9	300.00
	10-14	12	290.00
	15-19	15	281.00
	20-24	18	271.00
	25+	20	264.00
IBM expEDIte 400	1-3	0	$440.00
	4-5	6	414.00
	6-9	9	400.00
	10-14	12	387.00
	15-19	15	374.00
	20-24	18	361.00
	25+	20	352.00

RSVSF-V2

1. **Fixed monthly and variable charges**

Service / Data base name	Charges
Remote Screen Viewing Support Facility monthly subscription	$ 193.00
Remote Screen Viewing Support Facility moderator per screen	$ 1.65

RSVSF-V2 has no CRU charges, CRU surcharges, or DASD requirements associated with it.

LU 6.2 Inter-Operational Test Service

1. **One-time charges**

Service / Data base name	Charges
LU 6.2 Inter-Operation Test Service one-time charge	$28,600.00

The above one-time charge is in addition to normal IBM Information Network charges shown on the General Schedule of Charges Exhibit, and on the Computing Service Schedule of Charges Exhibit.

IBM Information Network
P.O. Box 30104
Tampa, FL 33630-3104

March 6, 1990

International Business Machines Corporation Armonk, New York 10504

EXHIBIT
Non-IBM Programs and/or Data Bases Schedule of Charges
IBM Information Network Agreement

Form No.: Z125-4210-05
Exhibit No.: IN3RD-05
December 15, 1989

This Exhibit applies to a Service(s) which consists of access to, and use of, a non-IBM program(s) and/or data base(s).

Each company listed in this Exhibit (Provider) and IBM have entered into an agreement which allows you to access and, subject to the Provider's authorization, use such Provider's program(s) and/or data base(s) through a Service.

Each Provider owns, maintains and supports its program(s) and/or data base(s) identified in this Exhibit.

Changes to the program(s) and or data base(s) identified in this Exhibit are under the control of the relevant Provider. IBM's provision of a Service listed in this Exhibit is contingent upon the continued availability of the relevant Provider's program(s) and or data base(s). Therefore, IBM reserves the right to change such Service, or discontinue the provision of such Service upon written notice, effective immediately.

IBM provides each Service listed in this Exhibit on an "AS IS" basis and shall have no liability regarding conformance of such Service to its description. IBM has no responsibility for support of any Provider's program(s) and/or data base(s). You should contact the relevant Provider directly for assistance on any non-IBM program or data base problem.

IBM charges associated with your access and use of a Service listed in this Exhibit are as specified in the applicable Exhibit(s). IBM will invoice you for all charges which you incur by using such Service, except for any charges specifically excluded in this Exhibit.

A Service listed in this Exhibit may have charges associated with it which are in addition to those charges which IBM invoices to you. Such charges, if any, will be invoiced to you directly by the relevant Provider.

PROGRAM DATA BASE NAME	COMPANY	CHARGES
Agridata	AgriData Resources, Inc.	Network traffic excluded
Commercial SABRE* EAASY SABRE*	American Airlines, Inc.	
American Express ON-Line Access	American Express Travel Management Services	
AEA Direct	American Electronics Association (AEA™)	CRUs and NRUs excluded. Provider Usage Charge (PUC) of $30 hour connect time.
BRS™	BRS Information Technologies	
Computerized Vehicle Valuation VINguard™	Certified Collateral Corp.	Network traffic excluded
STN International®**	Chemical Abstracts, Inc.	Network traffic excluded
SURE™	COREMAR, A Division of Northwestern National Life Insurance Company	Network traffic excluded

PROGRAM DATA BASE NAME	COMPANY	CHARGES
DIALOG® Information Retrieval Service	DIALOG Information Services, Inc.	Network traffic excluded
Dow Jones NEWS/RETRIEVAL® Service	Dow Jones & Company, Inc.	Network traffic excluded
DunsPrint® 3270	Dun & Bradstreet Credit Services	
LOMANET®	Life Office Managament Association (LOMA®)	Network traffic excluded
LEXIS®/NEXIS® Services***	Mead Data Central, Inc.	
OAG®	Official Airline Guides, Inc.	
PMSC MVR Service PMSC MICRO MVR Service	Policy Management Systems Corporation	Network traffic excluded
ANALYST*	Telebase Systems, Inc.	Network traffic excluded. Product Access Time charge of $3.70 per hour prime and $1.85 per hour non-prime.
Union Bank/Remote Terminal Processing	Union Bank, Institutional Trust Services	Network traffic excluded
WESTLAW®	West Publishing Company	Network traffic excluded
Western Union Easylink*-Profs to Telex Service	Western Union Telegraph Company	Network traffic excluded
Wiltek Worldwide Communication Services	Wiltek, Inc.	Network traffic excluded

PROGRAM DATA BASE NAME	COMPANY	CHARGES
Agency MVR Ordering System	Equifax, Inc.	IBM will invoice you for charges that you incur by sending to Equifax's mailbox and receiving from your mailbox. IBM will invoice Equifax for charges that Equifax incurs by sending to your mailbox and receiving from Equifax's mailbox.
First Chicago's PayStream	First National Bank of Chicago	IBM will invoice you for charges that you incur by sending to First Chicago's mailbox and receiving from your mailbox. IBM will invoice you for charges you incur by First Chicago sending to your mailbox and receiving from First Chicago's mailbox.

* Service Mark

** Registered Trademark of American Chemical Society.

*** Services and Trademarks of Mead Data Central, Inc. that are registered with the U.S. patent and trademark office.

BT TYMNET
2560 North First Street
San Jose, CA 95131
(408) 922-0250

Key EDI Contacts:
Ron Bamberg, VP Planning
Rand Walker, Manager EDI Products
Revenues: $300 Million
Employees: 1,500+

The Company

BT Tymnet is one of the world's largest suppliers of public, private, and hybrid value-added network solutions and related network application services. Its parent, British Telecom, is a $20 billion diversified supplier of telecommunication services.

EDI Offering

BT Tymnet's service offering is called EDI*Net. It offers a broad range of network services, certified translation options, gateways to other third-party EDI networks, switching technology, customized implementation services, EDI education, and customer support.

Network Services

Network services are available through the public Tymnet network with local access to 850 domestic U.S. locations and 80 foreign countries.

EDI Software

BT Tymnet offers proprietary switching software and translation software through a wide variety of certified third parties.

Consulting and Installation

BT Tymnet supports end-user implementation by managing EDI pilots and trading partner programs. Trading partner implementation, customized program documentation, and program management are some of the services provided to make transition to EDI more effective.

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Education/Training

The company was one of the first third-party vendors to host general education seminars explaining EDI. A three-day "Principles of EDI" course, presented by EDI Education, Inc. and hosted by BT Tymnet, explains the concept of EDI and shows how it is used to increase the profits and performance of organizations.

Sales and Service Locations

In addition to 22 field offices, EDI*Net users' technical and business questions are handled by a centralized support staff via an 800 number.

Customer Base

User Characteristics

EDI*Net clients include the following industries:

- Aerospace
- Automotive
- Banking
- Chemical
- Electrical
- Electronics
- Health Care
- Motor
- Ocean
- Oil/Gas
- Rail
- Retail
- Telephone
- Textile/Apparel

Key Users

R.J. Reynolds, Service Merchandise, John Deere & Co.

Other Related Business

In addition to public, private and hybrid data network services, BT Tymnet offers electronic mail (OnTyme and Dialcom), credit card and check authorization services, and logistic information for shippers.

EDI Organization

BT Tymnet recently reorganized its "lines of business" into a functional organization structure. As a result, what was once a single integrated EDI unit is now embedded in separate companywide marketing, support, and operations organizations.

EDI Strategy

BT Tymnet is positioning itself as the premier global EDI service provider.

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Marketing

Market Share

BT Tymnet ranks as the third largest services provider, behind GEIS and Sterling Software, with 13% of the 1989 market.

Liability for Errors/Lost Data

None

Pricing

See attached Rate Schedules.

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BT / Tymnet

EDI*Net Rate Schedule

Fixed Charges

MAILBOX SERVICE	Asynchronous [1] Mailbox	Initial Mailbox $25/month	Subsequent Mailboxes $25/month
	Bisynchronous [2] Mailbox	Initial Mailbox $200/month	Subsequent Mailboxes $100/month
TIME-BASED OUTDIAL OPTION	Initial Time-based Outdial Option $200/month		Subsequent Time-based Outdial Option $100/month

Variable Charges

Charge Components of EDI*Net Peak [3]	Communications Send	Distribution	Communications Receive
Base Charges Per 1000 characters	$0.30	$0.30	$0.30
Time-Based Outdial Surcharges	$0.10	- 0 -	$0.10

Charge Components of EDI*Net Off Peak [4]	Communications Send	Distribution	Communications Receive
Base Charges Per 1000 characters	$0.20	$0.20	$0.20
Time-Based Outdial Surcharges	$0.10	- 0 -	$0.10

Monthly minimum applies to all invoices: $100.00

Discount Schedule

Applies to Monthly Variable Charges	$ 500 - 5,000	15 percent discount
	$ 5,001 - 10,000	30 percent discount
	$10,001 +	45 percent discount

Personnel Services

Principal Consultant/Specialist	$165.00 per hour
Senior Consultant/Specialist	$150.00 per hour
Consultant/Specialist	$130.00 per hour
Associate Consultant	$102.50 per hour
Product Analyst	$ 82.50 per hour
Programmer/Analyst	$ 77.50 per hour

Footnotes:

[1] Must use BT Tymnet Inc. certified asynchronous error checking protocols.
[2] All other asynchronous and bisynchronous connections.
[3] Peak Hours - 5:01 AM to 8:59 PM (Central Standard Time)
[4] Off-Peak Hours - 9:00 PM to 5:00 AM (Central Standard Time)

11/89

*EDI*NET PRICING EXAMPLES*

The four pricing scenarios are based on "Company A" sending, distributing, and receiving communications of **1,000,000** characters/month and "Company B" sending, distributing, and receiving responses of **50,000** characters/month.

Example #1

Company A Customer (Bisynchronous)	Charge	Company B Customer (Bisynchronous)
$200	Mailbox	$200
Peak /Off Peak		Peak /Off Peak
$300/$200	Communication Send	
$300/$200	Communication Distribute	
	Communication Receive	$300/$200
	Response Send	$15/$10
	Response Distribute	$15/$10
$15/$10	Response Receive	
$615/$410	Monthly Variable Charge	$330/$220
$597.75/$410	less 15% Incremental Discount	$330/$220
$797.75/$610	Monthly Total (Fixed + Variable)	$530/$420

Example #2

Company A Customer (Asynchronous)	Charge	Company B Customer (Asynchronous)
$25	Mailbox	$25
Peak /Off Peak		Peak /Off Peak
$300/$200	Communication Send	
$300/$200	Communication Distribute	
	Communication Receive	$300/$200
	Response Send	$15/$10
	Response Distribute	$15/$10
$15/$10	Response Receive	
$615/$410	Monthly Variable Charge	$330/$220
$597.75/$410	Less 15% Incremental Discount	$330/$220
$622.75/$435	Monthly Total (Fixed + Variable)	$355/$245

Example #3

Company A Customer (Bisynchronous)	Charge	Company B Associate (with TBO Option)
$200	Mailbox (For Company A)	
$100	2nd Mailbox (For Company B)	
$200	TBO Surcharge (For Company B)	
Peak /Off Peak		
$300/$200	Communication Send	
$300/$200	Communication Distribute	
$400/$300	Communication Receive (Includes TBO Surcharge)	
$20/$15	Response Send (Includes TBO Surcharge)	
$15/$10	Response Distribute	
$15/$10	Response Receive	
$1050/$735	Monthly Variable Charges	0
$967.50/$699.75	Less 15% Incremental Discount	0
$1467.50/$1199.75	Monthly Total (Fixed + Variable)	0

Example #4

Company A Customer (Bisynchronous)	Charge	Company B Noncustomer
$200	Mailbox	
Peak /Off Peak		
$300/$200	Communication Send	
$300/$200	Communication Distribute	
$300/$200	Communication Receive	
$15/$10	Response Send	
$15/$10	Response Distribute	
$15/$10	Response Receive	
$945/$630	Monthly Variable Charges	0
$878.25/$610.50	Less 15% Incremental Discount	0
$1078.25/$810.50	Monthly Total (Fixed + Variable)	0

Technology

Network Configuration

North America:

- The domestic public network has a T1 backbone connecting seven U.S. cities (New York, Washington, D.C., Chicago, Dallas, Denver, Los Angeles, San Francisco).

International:

- Direct connections are available in 80 foreign countries.

Interconnection with Other Networks

The company currently provides no-cost gateway service to the following public networks:

- Agridata
- AT&T
- CompuServe
- Control Data Corp. (REDINET)
- GE Information Services
- Harbinger Computer Services
- IBM Information Services
- Kleinschmidt
- ORDERNET Services (Sterling Software)
- Sears Communication Network
- TranSettlements
- Union Pacific Technologies
- Userbase Systems
- Western Union

Private Networks

EDI*Net receives data from and/or sends data to several private networks:

- Chrysler
- Ford
- General Motors
- KMart
- RAILINC
- Sears

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Local Access Ports

Present:

- Approximately 14,000

Future:

- BT Tymnet plans expansion in the number and location of sites (driven by specific customer needs) and upgrades in site capacity and access speeds.

Switching Systems

Hardware:

- BT Tymnet has redeveloped its message-switching host software to run on fault-tolerant Tandem hardware. This system provides a foundation for such applications as SNA access, EDIFACT exchange, X.400 communications, and priority interval delivery. Formerly, IBM 3083s were used as switching hardware.

Software:

- Internally developed proprietary switching/message handling software.

Protocols Supported

Network to Terminal:

- X.25, ASYNC, 3270 BSC, 3270 SNA, ALC 2946, 2780/3780 HASP, SDLC, Burroughs Poll Select, Unisys

Network to Host:

- SDLC, 3780/2780 HASP, ALC 2946, 3270 SNA, 3270 BSC, ASYNC, X.25, Burroughs Poll Select, Unisys

Future Protocol Support Plans

Plans will be developed as demanded by the market--expect LAN protocol support and 5250 support for IBM System 36 and 38s.

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Data Formats Supported

ANSI X12 (AIHE, CIDX, WCS); TDCC (UCS, WINS); EDIFACT

The EDI*Net approach to EDI translation enables users to choose the package that best fits their needs and the requirements of the industry. EDI*Net translation options provide users with the flexibility required to involve many business partners.

The EDI*Net Translation Software Certification Program tests commercially available EDI translation packages, verifies their compatibility with EDI*Net, and establishes a certified link between each translator and EDI*Net.

The vendors identified on the following tables market EDI translators that have successfully accessed EDI*Net and sent messages through the EDI*Net distributor. BT Tymnet makes no evaluation of the relative quality of one package versus another.

Data Format Translation Location

Translation is performed at the user site. Network translation is not commercially offered.

Source of EDI Technology

BT Tymnet pioneered its own proprietary technology. A major shift has taken place with the adoption of Tandem mainframes and the latest proprietary "Turbo Engine" with an open architecture to support industry standard networking software.

BT Tymnet covers a wide range of format translators via its third-party certification program.

MHS Protocol/X.400 Plans

Dialcom E-Mail product is X.400 compatible. No other plans announced.

ISDN Plans

BT Tymnet is currently researching the fit of ISDN with its service offerings.

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*EDI*Net Certified Microcomputer Translators*

CERTIFIED TRANSLATION SOFTWARE VENDOR	VENDOR CONTACT	CERTIFIED HARDWARE CONFIGURATION	SUPPLEMENTARY COMMUNICATION SOFTWARE REQUIRED	TRANS-MISSION	OPERATING SYSTEM	OTHER CONFIGURATIONS AVAILABLE*
Advanced Communications Systems "ACSX12" Version 1.20	Mr. Robert Stone (216) 779-5424	IBM PC XT/AT Microgate 201C	N/A	Bisync	MS DOS	Mainframe
American Business Computer "EDE-PC"	Mr. Kimba Vasquez (313) 930-7840	IBM PC XT/AT Hayes Modem	N/A	Async	MS/PC DOS V2.0	IBM 30XX and 43XX
APL Group, Inc. "Qualedi"	Mr. Frank Bridge (203) 762-3933	IBM PC XT/AT Hayes Modem	N/A	Async	MS/PC DOS	
Birmingham Computer Group, Inc. "FTS" Version 2.3	Mr. Walter Jankowski (313) 540-0640	IBM PC XT Bell 201C/Cleo	N/A	Bisync		DEC VAX HP 3000
Data Networks Unlimited, Inc. "Data Express"	Mr. Bernie Georg (415) 256-8007	IBM PC AT/386 Hayes Modem (A) UDS SYNC-UP 208 (B)	Tym/COMM (A) N/A (B)	Async/ Bisync	MSDOS	
DNS Associates, Inc. "EDI/EDGE"	Mr. John Witten (215) 327-1022	IBM PC XT/AT Hayes Modem	N/A	Async	MSDOS V2.1	
Dynamic Business Systems "TRANS-SYNC"	Mr. Dennis Chatfield (216) 835-8280	IBM PC XT/AT UDS/Sync-Up Board	N/A	Bisync	MSDOS V2.0	
EDI, Inc. "Telink"	Mr. Robert Marien (301) 670-0811	IBM PC XT/AT Hayes Modem (A) CLEO Board (B)	N/A (A) N/A (B)	Async/ Bisync	MSDOS V3.1	
Foretell Corporation "ESP" and "ESP2"	Mr. James Parker (312) 272-1850	IBM PC XT/AT Foretell ESP2400	N/A	Bisync	PCDOS V3.0	PC/2 Model 30
Innovative Computing Corporation "EDIPREP"	Mr. Jay Price (405) 949-9070	XT Compatible Hayes Modem	N/A	Async	MSDOS V3.2	
Lloyd Bush & Associates "X-Change"	Ms. Marcy Baughman (212) 962-4004	IBM PC XT/AT Hayes Modem	N/A	Async	MSDOS V3.0	
Management Computer Systems "MCSCOMPLETE"	Mr. David Walsh (201) 272-3080	IBM PC XT/AT Hayes Modem	N/A	Async	MSDOS	
Metro-Mark Integrated Systems "MICRO*Translator"	Mr. Al Lozito (516) 741-5000	IBM PC AT Hayes Modem (A) Bi ComM-3700 (B)	N/A (A) N/A (B)	Async/ Bisync	PCDOS	See Minicomputer and Mainframe Lists
Nolan Network, Inc. "NNINet"	Mr. Darrell Ford (615) 832-6500	IBM PC XT Hayes Modem	Tym/COMM (A)	Async		
Piedmont Systems, Inc. "Tel-EDI"	Mr. Chuck Cloer (919) 760-3620	IBM PC XT/AT AT&T 6300 Tandy 3000 Everex AT Hayes Modem CDS X.PC Modem	N/A	Async	MSDOS	See Minicomputer List
RAILINC "EDI/Synapse"	Mr. Dan Williams (202) 639-5581			Bisync		
Release Management Systems "RMS-VLT" Version 6.2	Ms. Arlene Tomlin (313) 462-1200	IBM PC XT/AT Hayes Modem (A) CLEO Board (B)	Crosstalk (A) MK.4 Rel. 1.01 N/A (B)	Async/ Bisync	MSDOS V3.0 BTOS	
St. Paul Software, Inc. "INTERCONN"	Mr. Gary Anderson (612) 641-0963	IBM PC XT/AT Hayes Modem	N/A	Async	MSDOS V3.1	
Supply Tech, Inc. "STX12" Version 2.3, Rel. 4	Mr. Wendell Holladay (313) 357-3430	IBM PC XT/AT Hayes Modem (A) CLEO Board (B) Winter-Halter Board (B)	N/A (A) N/A (B)	Async/ Bisync	MS/PC DOS V3.0	

EDI*Net Certified Minicomputer Translators

CERTIFIED TRANSLATION SOFTWARE VENDOR	VENDOR CONTACT	CERTIFIED HARDWARE CONFIGURATION	SUPPLEMENTARY COMMUNCATION SOFTWARE REQUIRED	TRANS-MISSION	OPERATING SYSTEM	OTHER CONFIGURATIONS AVAILABLE*
ACS Network Systems "EDI/36" "EDI/38"	Mr. James Bert (415) 827-3820	IBM System/36 Racal Milgo IBM System/38 General Data Comm.	N/A N/A	Bisync Bisync	SSP CPF	
Advantage Systems, Inc. "EDI Advantage"	Mr. David Williams (313) 979-4260	IBM System/36 Codex or UDS	N/A	Bisync	IBM	
Metro-Mark Integrated Systems "Translator*36" "Translator*38"	Mr. Al Lozito (516) 741-5000	IBM System/36 User Specified IBM System/38 User Specified	N/A N/A	Bisync Bisync	SSP CPF	IBM System/34, AS 400 See Microcomputer and Mainframe Lists
Piedmont Systems, Inc. "Tel-EDI"	Mr. Chuck Cloer (919) 760-3620	Wang 220 CDS 224 Series II	N/A	Async	Wang	VMS, UNIX

EDI*Net Certified Mainframe Translators

CERTIFIED TRANSLATION SOFTWARE VENDOR	VENDOR CONTACT	CERTIFIED HARDWARE CONFIGURATION	SUPPLEMENTARY COMMUNCATION SOFTWARE REQUIRED	TRANS-MISSION	OPERATING SYSTEM	OTHER CONFIGURATIONS AVAILABLE*
EDI Solutions, Inc.	Mr. Richard York (612) 831-9000	IBM	**	N/A	MVS	DEC VAX, HP3000 IBM S/38. 30xx, 43xx
TranSettlements, Inc.	Mr. Bob Canis (404) 996-8109	IBM	**	N/A	MVS	Burroughs, Honeywell Sperry
Metro-Mark Integrated Systems	Mr. Al Lozito (516) 741-5000	IBM	**	N/A	MVS/VSE	See Microcomputer and Minicomputer List

* The vendor has identified that these additional configurations are available. However, EDI*Net has not certified the compatibility of these configurations with the EDI*Net network. EDI*Net mailbox installation will be longer for these configurations than with certified configurations.

** A mainframe translation package must be installed with a certified communication package (i.e., EDI*Net VS3780, Tracs®, or Supertracs®) to achieve an EDI*Net-certified environment. The "VS3780" file transfer facility, which allows a computer to emulate an IBM 3780 RJE station, is provided to EDI*Net customers at no cost. However, when provided at no cost, VS3780 communication is supported only for accessing an EDI*Net mailbox: no other communication will be supported.

Alliances

Government Relationship/Contracts

No government contracts have so far been made public.

Joint Ventures/Licenses

On February 26, 1990, BT Tymnet and The Sequor Group, the processing division of Security Pacific Corporation, announced the formation of an alliance to provide a single source for financial and network electronic data interchange (EDI) services.

The BT Tymnet and Sequor partnership is the first to offer a full range of EDI implementation services including customer service support in planning, coordination and maintenance of trading partner relationships. Known as the Customized Program Implementation (CPI) service, it will support all phases of a customer's transition to EDI. Through the alliance, BT Tymnet and Sequor will cross-market each other's EDI service.

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MCI COMMUNICATIONS CORPORATION
1133 19th Street, N.W.
Washington, D.C. 20036
(202) 293-4255

EDI Contact: Susan Houck
EDI Product Manager
1989 revenues: $6.4 billion

The Company

MCI began as Microwave Communications, Inc. and intended to provide short-haul communications links. These links became longer and, overcoming AT&T's monopoly along the way, the company became the most successful interexchange carrier, with its own microwave, fiber optic, and satellite networks.

The company, through its subsidiaries, provides various domestic and international services, including voice, data, telex, facsimile and E-mail services.

EDI Offering

Network Services

MCI provides transport services for EDI users who have their own translation capabilities. It is seeking partnerships with software vendors to supply translation solutions for customers. MCI offers EDI message transport services as an extension of it basic MCI Mail service. MCI offers basic data transport and store-and-forward services to the EDI-using company. MCI is focused on providing X.400 EDI and is committed to supporting P-EDI. MCI offers to develop custom solutions to the customer for such requirements as formatting, translation, transmission, compliance checking, etc.

EDI Data Formats Supported

MCI supports EDI formats only to the extent it supports basic data transmission over a packet-switched network. It has no special software functionality that performs compliance checking, for example. MCI supports the transport of any and all EDI formats that are the bodypart to a message (ie contained within an envelope as message text). MCI looks to software vendors to provide complicance checking, standards updates, etc. As added security, MCI does not look at the contents of a message. All routing is performed based on the envelope.

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EDI Software

Currently, MCI does not provide EDI translation software of its own nor resells third party software with its label on it. To provide its EDI customers with software, MCI intends to partner with third partner software vendors. No partners have been announced at this time.

Education and Consulting

MCI intends to work with third parties to provide its customers with professional services (education, training, implementation, service, etc.) beyond the technical support, implementation services, and training offered to all customers.

Other Network Services

MCI introduced an E-mail service, "MCI Mail," in 1983. It has become the the third largest public E-mail network in the U.S. offering E-mail, facsimile, telex, postal, and courier delivery worldwide for users of its 110,000 customer mailboxes. CompuServe and BT Tymnet are numbers one and two, respectively.

In March 1989, MCI introduced MCI WorldMail, an enhanced service option of MCI Mail. It has the features of MCI Mail with localized in-country service, local billing, support, access, and marketing. MCI WorldMail is designed to meet the needs of corporations whose business is international in scope. MCI WorldMail is currently available in 12 countries.

MCI Mail, including its X.400 service, provides the foundation on which MCI places other data and messaging services, including EDI.

In addition to the EDI relay capability of MCI Mail's X.400 service, other related services offered by MCI are:

- MCI Mail Scripts. A customized application allowing customers to prepare fill-in-the-blank electronic forms for delivery to addressee(s) via electronic, paper, facsimile, or telex means. Scripts provide formatting, translation, and delivery services to recipient mailboxes. Also, provided are input validation, calculations, and owner-controlled output formatting.

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- Automated Money Transfer Service (AMTS). Provides formatting, translation, and transmission of incoming message traffic (typically, on telexes) for the international banking community. Using AI technology, AMTS "reads" a bank's incoming messages and sorts out the time-critical money transfer orders from other non-money transfer messages. As it processes the money transfer messages, AMTS extracts the unformatted information and verifies the data. After processing the information, AMTX then outputs the payment instructions in either ISO or SWIFT format for the banks's internal processing.

- MCI Mail Link family of software products provide transparent transmission and mailbox services to users of in-house office automation systems (DEC All-In-One, Wang OFFICE, IBM PROFS, HP Desk Manager, etc). The MCI Mail Link software performs the transparent exchange of batch messages with MCI Mail, and enable inbound messages to be locally distributed and processed.

- MCI Mail Data Dispatch provides both transmission and mailbox functions; customer-developed interface software provides the flexibility to integrate applications and translation requirements. Designed for users with high volume messaging needs using the high-speed 3780/RJE bisynchronous protocol.

Customer Base

User Characteristics

MCI has identified aerospace, petroleum, finance, and manufacturing as the focus of its EDI efforts.

Key Users

INPUT estimates MCI's EDI customer base to be less than 50 companies that are explicitly EDI users. (Although, MCI just transports data by its MCI Mail service. EDI usage is not necessarily detectable). Its single largest known customer is Texas Instruments. How many Texas Instruments trading partners subscribe to MCI's network is unknown.

Marketing

Market Share

INPUT estimates that MCI's share of the EDI network services market is less than one percent in terms of customer revenues on EDI services.

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Profit Centers

Unavailable

Sales and Service Locations

MCI maintains 48 sales offices throughout the continental United States and 53 offices in 46 countries around the world.

Through licensees for its WorldMail product, it maintains offices in Japan, the U.K., Belgium, Denmark, Chile, Israel, Columbia, West Germany, South Korea, Philippines, Spain, Switzerland, and Greece.

Liability for Lost Data

"MCI's sole liability for any defect in the service is limited to the lesser of the amount of any charges for the defective service or five hundred dollars ($500.00). In no event our provision of service, whether or not MCI had any knowledge, actual or constructive, that such damages might be incurred." [-from product literature]

User Start Up Procedures

Depends on customer.

Pricing

MCI Mail charges per electronic message according to the following schedule:

- up to 500 characters: $.45
- 501 to 2500 characters: $.75
- 2501 to 7500 characters: $1.00
- each additional 7500 characters: $1.00
- to MISSIVE users (France), up to 7500: $2.50
- each additional 7500 characters: $1.00

Charges are for E-mail delivery only (not facsimile, telex, post, or courier). Note that MCI charges for sending only. There is no charge to receive a message. MCI offers toll-free access to the MCI Mail network.

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For customers who use BT Tymnet to access the MCI network: $.25 per minute, minimum one minute.

Technology

Equipment and Systems

MCI operates a private X.25 packet switched network. This network is the platform on which MCI offers its mail, messaging, and general data transport service.

MCI customers access the network either by a toll free dial up (using the MCI long distance voice backbone network) or via BT Tymnet (which offers over 500 local access ports in cities throughout the country).

Network Configuration

Unavailable.

Interconnection Arrangements

MCI's data network is interconnected with six other mail networks in the U.S. and two abroad.

MCI is still determining how it will interconnect with INFONET, a global value added network in which MCI bought a 25% stake. Infonet is owned by a consortium of major telecommunications administrations (PTTs) of European and Asia-Pacific countries. By virtue of interconnecting its existing network to INFONET, MCI will hence be interconnected with these PTTs. The PTTs in the INFONET consortium are Deutsche Bundespost Telekom (West Germany), TRANSPAC/France Telecom, PTT Telecom Netherlands, Regie Des Telegraphes Et Des Telephones (Belgium), Singapore Telecom International Pte. Ltd., Swiss PTT, Telecom Australia, Swedish Telecom International, Telefonica International (Spain), and Kokusai Denshin Denwa Co., Ltd. (KDD-Japan).

INFONET uses X.400 to link its consortium networks as well as to link into corporate internal networks.

U.S. networks that MCI is interconnected with using the X.400 standard are: AT&T Mail, BT Tymnet (Dialcom), SprintMail, and the IBM Information Network. MCI is connected to CompuServe and the academic research network InterNet, using non-X.400 interconnect.

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Abroad, MCI is connected with Italy's PT Postel (using X.400) and France's Missive (not using X.400). More interconnects are under negotiation.

Protocols Supported

For non-X.400 users (the majority today), MCI supports asynchronous dial-up (used primarily by PC users) and the 3780/remote job entry protocol (used primarily for mainframe host-to-host communications). Non OSI-protocols are stripped off a data stream and replaced with X.25/X.400 protocols for internal routing on MCI's packet network.

Protocol Support Plans

MCI believes that EDI and messaging will merge in the near-term, specifically, that EDI will be but one of the many objects that will be transported via X.400. MCI's X.400 service allows MCI Mail subscribers to exchange interpersonal messages with inteconnected private and public electronic mail systems which also conform to the CCITT X.400 Recommendations. In addition, this offering also supports the end-to-end transport of EDI between X.400 systems. Finally, the X.400 service acts as a gateway for the exchange of interpersonal messages between X.400 and non-X.400 users.

MCI is readying "Phase II" of its X.400 offering, a new OSI Message Handling System based on the 1988 version of the X.400/X.500 CCITT standard. In addition to supporting P-EDI, it will also support industry-specific EDI applications.

Protocol Conversion

MCI moves data on its network via the X.25 protocol. Incoming transmissions that are of a different protocol are converted at the first switching station to X.25.

EDI and ISDN

Like its commitment to OSI, MCI is pursuing ISDN services to the extent that they are technically able to be implemented and that they are asked for by customers.

Sources of Technology

MCI partners with hardware and software vendor for the provision of voice, data, and fax systems.

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Switching Systems

Unavailable.

Data Format Translation

MCI will translate customer data formats on a per request, custom basis. MCI Mail offers scripts (electronic forms) and Automated Money Transfer Services.

Strategies and Alliances

Summary

- Global interconnection
- Go after large accounts.
- Offer EDI as one of total telecommunications solution (voice, data, fax)
- Build internal systems around OSI standards but be pragmatic in dealing with customers. Give customers whatever they want.
- Interconnection of dissimilar systems.
- Leverage existing company resources, particularly long distance, high capacity (fiber optic) backbone network.
- Evolve market and company incrementally, responding to new conditions. Don't implement technologies and product offerings just because they are technically elegant but rather because they are customer driven/market requirements.
- Use alliances and third-parties to supply tangential products and services when needed, such as EDI translation software and professional services. Concentrate on building core business, telecommunication services.
- Be a one-stop, total messaging provider.

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Background

MCI has a reputation for being dynamic, a scrappy fighter, a savvy marketer, and sometimes financially tenuous. MCI has monitored the EDI marketplace and strategically positioned itself to take advantage of the X.400 IPM/EDI messaging boom.

Since its founding the late sixties up through 1987, MCI has operated at a loss. In 1987, its stock price sank as low as $5 per share. About the same time, IBM bought a 17% stake in the company with rights to increase it to 30% without MCI's approval. MCI has since bought back IBM's stake.

In a 1986 restructuring of the company (which included a layoff of 15% of its workforce), MCI declared a strategy to sign up big, multinational customers and to become a leader in global voice and data telecommunications. Today, MCI has grown to a $6.4 billion corporation.

The company has landed large contracts with such companies as United Airlines, Aetna Life & Casualty, Chrysler, Ford Motor Credit, the Pentagon, Baxter International, Citicorp, American Express, Home Shopping Network, General Motors, J.C. Penney, Georgia-Pacific, Westinghouse, and most notably with Merrill Lynch.

In early 1990, MCI bought 25% of INFONET (El Segundo, CA), a global third party VAN held by an international consortium of mostly PTTs. MCI is the largest shareholder of the consortium. Interconnecting the INFONET network with MCI's network has yet to be done. Such an interconnection would expand MCI's global reach tremendously. INFONET operates in over 100 countries. Also, the acquisition brings sales and service offices and distributor relationships throughout the world.

MCI sees itself as strictly a telecommunications service provider. To this end, its strategy is to develop this core business with customers. For those telecom services that require tangential products and services, such as software and consulting, MCI partners with providers of those products and services. MCI does not make its own EDI software. It does not make the hardware or equipment that is used in its backbone long distance network. MCI is a service provider who builds strategic partnerships with other industry leaders.

For data communications, MCI is firmly committed to CCITT standards for data communications especially OSI and ISDN families. It participates in CCITT X.400 standards definition process, in 1988 it began accepting X.400 formatted messages from

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process, in 1988 it began accepting X.400 formatted messages from customers, and it is developing a fully conformant 1988 version the X.400 Message Handling System for its network.

However, they are committed also to customers who do not have capabilities in these standards. MCI, thus, offers bridge technologies were necessary. Customers at any level of technical sophistication are able to talk with any other.

MCI believes that EDI and messaging will merge in the near-term, specifically, that EDI will be but one of the many objects that will be transported via X.400. The current MCI X.400 service allows MCI Mail subscribers to exchange interpersonal messages with interconnected private and public electronic mail systems which also conform to the CCITT X.400 recommendations. In addition, this offering also supports the end-to-end transport of EDI between X.400 systems. Finally, the X.400 service acts as a gateway for the exchange of interpersonal messages between X.400 and non-X.400 users.

MCI has not identified EDI as a major market to develop as has GEIS, Sterling Software, or Control Data. MCI sees EDI as another message type used by customers. Its EDI offering is a component of its E-mail offering, MCI Mail. EDI marketing personnel are located within the MCI Mail marketing division. MCI is not a high profile player in the EDI services market.

MCI's EDI offering, like MCI's E-mail offering, leverages MCI's core asset, its long distance backbone. EDI and E-mail customers use a toll-free dial up phone number to access MCI's data network. This contrasts with Telenet/SprintNet and BT Tymnet which have local number access points in major cities throughout the U.S.

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STERLING SOFTWARE/ ORDERNET SERVICES, INC.
1651 Northwest Professional Plaza
Columbus, OH 43220-0908
(614) 459-7500

William Plumb, President
Division of Sterling Software
Total Employees: 160
Total Fiscal 1990 Revenues: Over $25M

*INPUT Estimate

The Company

Sterling Software Inc. is the parent company for three groups of software and services businesses: Applications Software, Systems Software, and Federal Systems Group. The company has over 5,000 customers, including 85 of the Fortune 100, over 80 of the 100 largest U.S. commercial banks and numerous government agencies.

In August 1985, Sterling Software purchased Informatics General (Canoga Park, CA), a 23-year-old processing, professional services and software vendor for $126 million. Informatics had provided EDI services to several industries, and the ORDERNET Services Division, which is now part of Sterling Software's Application Software Group, grew out of that endeavor.

The sole focus of ORDERNET Services is EDI software products and services. Turnkey systems for various retail and distribution environments are available from other units of Sterling Software.

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EDI Offering

EDI Network Services

Sterling traces its EDI involvement to 1975 when Informatics General began EDI services to the wholesale pharmaceutical industry under the ORDERNET name.

Translation between X12, UCS, and industry-specific standards is available through an in-network translation service. EDI-VICS/X12 service is for the retail industry, and Sterling is very active in this area. Communications, supporting most devices, is primarily handled through toll-free numbers, although Sterling may also be accessed via Telenet. Sterling has both dial-up and lease-line SNA capability to communicate to micros, minis, and mainframes.

Sterling's EDI-linked database product MarketQuest (TM) builds on EDI documents that trading partners send during the normal course of business. This information is collected only when a trading partner has given prior written approval that they wish to "carbon copy" MarketQuest. Sometimes, customer augment MarketQuest with extra EDI transactions sent expressly for the purpose of enriching a MarketQuest database. These databases are designed to provide market intelligence, track product flow and provide the creative tools necessary to enhance trading partner relations.

Certain MarketQuest reports are used by trading partners to gain vital, timely research on their market. MarketQuest helps evaluate sales penetration goals for field sales management, product development and product marketing staff. Under the customer's direction, MarketQuest programs determine market potential for sales territories and product lines. MarketQuest observes market reactions to new product releases, field sales force changes and product promotions. Other MarketQuest reports provide information to customers on what they or their affiliated partners have purchased over a month. Still other reports are used to help manage inventory or to monitor median prices on commodity products.

Sterling offers a media conversion service that permits electronic documents to be converted to hardcopy (EDI/LaserMail for mailing) or to facsimile transmissions (EDI/Facsimile for delivery to a recipients facsimile machine). This conversion allows a company to operate in a wholly electronic environment, cut costs and reduce clerical activities, and obviate the need to cncurrently use both electronic and paper documents.

EDI Software

With the acquisition of Metro-Mark Integrated Systems for $6.3 million in March 1990, the ORDERNET Services Division of Sterling Software now clearly dominates the EDI translation software market. ORDERNET and Metro-Mark had previously held the number one and two positions respectively in the market for mainframe translation

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two positions respectively in the market for mainframe translation software while Metro-Mark was also recognized as the largest EDI software provider in total across all hardware platforms. The full product line now includes the following platforms:

- IBM 30XX, 42xx,9370 under MVS and DOS/VSE
- DEC VAX under VMS
- IBM S/34, S/36, S/38, and AS/400
- IBM PC and PS2 families and compatibles
- Data General

The company has announced it will perpetuate both the popular GENTRAN and TRANSLATOR product lines and cross-build upon the respective strengths of each. It is anticipated the two will ultimately converge into a "super product". Followers of the mainframe marketplace know that GENTRAN and TRANSLATOR had been pacing each other in new functionality.

Features of Sterling's translation software include:

- ORDERNET Services' EDI software products translate data from internal fixed-length record formats to variable-length data formats for EDI transmission, and interpret received EDI communications back into internal formats for processing.

- Support for ANSI X12 and its subsets (CIDX, EDX, VICS), UCS, WINS, and TDCC (Motor, Rail, Ocean, Air) standards, as well as EDIFACT.

- Thorough compliance checking. This checking includes validation of control numbers, transaction IDS, segment IDS, segment sequencing, presence of mandatory segments and elements, minimum and maximum element length, element type, code values, frequency of segments and loops, and interelement dependencies. User exits are available if needed for additional processing.

- Online software maintenance (PC or CICS for IBM mainframe) include:

- *Trading Partner Profiles.* Dozens of options to customize trading partners include choices of envelopes, acknowledgements, versions, transaction, and control numbers.

- *Advanced Data Mapping.* Mapping is the process by which the application files are defined to the translator. The greatest advances in translation software in the last two years have occurred in this area. Sterling's need for external programming is entirely obviated. As a productivity tool, online mapping has reduced

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software implementation time by an order of magnitude. Includes code and data element translation tables (setup and maintain), conditional mapping, subfield mapping and user exits.

- *Standards Maintenance.* The user can now build and maintain his/her own standards using the existing standards as models. All facilitate through online screens. This is useful for creating"private" versions of standards for individual trading partners.

- *Security.* Each partner profile, map, standard, etc. can be secured by system user to have read-only access, full access, or no access. Production "locks" prohibit accidental disruption of production profiles, maps, etc. Each user has an ID and password and changes are recorded by user with date/time stamps.

- *Audit.* In addition to batch audit reporting capabilities, screens allow activity audit by partner by date/time range.

- *Prices.* Initial License Fees for the EDI Translators are as follows:

IBM Mainframe:	From $30,000
DEC VAX:	From $18,000
IBM S/3X:	From $6,000
IBM AS/400:	From $9,8000
IBM PC/PS2:	From $1,995
Data General:	From $18,000

- A unique offering: GENTRAN Plus for IBM mainframes, integrates translation, communications, mailboxing, and mapping into a fully automated EDI operation. GENTRAN Plus builds on the well-know strengths of GENTRAN and SUPERTRACS, Sterling's popular communications engine. GENTRAN Plus supports its own telecommunication lines (2780/3780 and SNA), performs autodial on a scheduled basis, and provides operator screens for controlling communications, restoring transmitted interchanges, viewing EDI data, etc.

- Although it is relatively new, GENTRAN Plus is the only product on the market which addresses the needs of large-sale IBM mainframe EDI operations. Initial License Fee for GENTRAN Plus ranges from $66,000 - $122,500. It is available for both MVS and DOS/VSE.

ORDERNET Services offers DOCULINK, a series of software products for microcomputers and mainframes. DOCULINK will facilitate bisynchronous or asynchronous communications between user and ORDERNET Services network.

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- DOCULINK/OS provides for bisynchronous communications, and works with IBM 30XX, 43XX, or compatibles running the OS operating system.

- DOCULINK/MNP is a software product to effect Microcom Networking Protocol (MNP) communications on an IBM PC or compatible.

- DOCULINK/BSC provides bisynchronous communications on IBM PC or compatible.

EDI Consulting

Sterling's Vendor Implementation Program has been instrumental in helping EDI clients to add large numbers of trading partners in a very short period of time.

EDI Education and Training

The company has established an education unit called The EDI Center, to educate functional business managers and technical experts on the benefits of EDI and a structured approach for integrating EDI into both systems and business procedures.

Sales and Service Locations

Sterling Software/ORDERNET has one sales and service office, the division's headquarters in Columbus, OH.

User Start Up Procedures

Once the customer has installed communications software on its computer and has set the dial-out parameters appropriately, it will conduct tests with ORDERNET's host. Logging on procedures and file transmissions are conducted. With the host connection established, the customer will then test sending files to a trading partner. Often, the start up procedures take only hours to complete.

Customer Base

Large trading communities are served in medical/surgical distribution, grocery, hardlines (hardware, housewares, and electrical), and retail/mass merchandise. A recently added focus is transportation. At the end of 1989, Sterling provided EDI services for approximately 1900 customers.

Related Businesses

Through other divisions, Sterling provides turnkey systems for various retail and distribution environments.

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EDI Strategy

Sterling is market driven. Accordingly, though continual monitoring of industry practices and needs, it seeks to anticipate market demands.

Sterling Software's stated corporate strategy is to select market niches offering high growth potential; acquire successful businesses providing services and products to those niches; group them by target markets; give them marketing, financial and management support as needed; and help the units maintain their autonomy as a way to keep them productive.

Sterling Software became the company it is today through acquisitions. Company officials state that Sterling will pursue large acquisitions. The recent $6.3 million dollar Metro Mark acquisition demonstrates Sterling's serious commitment to the EDI market place.

Marketing

Market Share

INPUT estimates that Sterling holds 16% of the EDI network services market. This market share places it second to GE Information Services, who holds 25%.

Perception of Competitors

Sterling's competitors acknowledge that Sterling is a force to be reckoned with in the EDI market. Its leading positions in network and software offerings makes it an aggressive competitor.

Pricing

(See company price schedule attached at the end of profile.)

Liability for Errors/Lost Data

Information not readily available.

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Technology

Network Configuration

Sterling has no network of its own. Customers dial-up Sterling's host using common telephone lines. They also can access the host via Telenet's network.

Interconnection with Other Networks

Sterling is interconnected with the major EDI service vendors in North America.

Local Access Ports

Because Sterling has no network of its own, it does not offer local access ports.

Switching Systems

Information not available.

Protocols Supported

Sterling supports all communication protocols including the many proprietary synchronous and asynchronous protocols.

Future Protocol Support Plans

Although Sterling intends to support any protocol that a customer may request, it expects to see the majority of its customers using the following protocols:

1. MNP (Microcom Networking Protocol) primarily used for micros, asynchronous. It is similar to SDLC in an asynchronous mode. Half of SSW's customers use it -- the small mom and pop, spoke, companies use it.

2. SNA. IBM's System Network Architecture. Increasingly becoming the choice of large companies, such as American President Lines (shipping), Levi Strauss & Co. (apparel manufacturer), Meyers (retail), Kroger (grocery distributor), and Mennan (manufacturer). It runs, however, on PCs as well. Came out in 1984 and used up until now primarily for online communications (between a terminal and a host). Now users are discovering it is a great file transfer method. It is IBM's equivalent to SDLC (synchronous data link communication)

3. 3780, 2780. These numbers originally refer to IBM terminal equipment that is attached to a host. The Uniform Code Council (UCC) sanctioned this protocol as a standard in the late seventies. Vendors of telecom

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software and hardware have, subsequently, built it into their products as one of the protocol options. Since it is relatively unsophisticated, it became the "common denominator" protocol that people used. Consequently, it has become the de facto communications standard. Every computer can emulate it.

4. HASP/RJE/Multileaving -- Almost as sophisticated as SNA more sophisticated that 3780

5. X.25. Not used much but more and more attention and customer requests.

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Data Formats Supported

Currently, Sterling serves other industries using both industry-specific formats, UCS, WINS, TDCC, and the ANSI X12 and EDIFACT standards.

Future Data Format Support Plans

Sterling will continue to support whatever the customer requests.

Data Format Translation Location

For those customers who request it, Sterling performs all translation (as well as other EDI services) at its EDI processing center in Columbus, Ohio. Otherwise, customers perform data translation on their own host computers, often using Sterling's translation software.

Source of EDI Technology

Sterling's first translation software package (Gentran) was based on the EDItran product of EDI Solutions Inc. (Minneapolis, MN). EDI Solutions Inc. makes a translator product that runs on Stratus computers as well as other mainframes (see profile of Stratus Computer).

Sterling's second translator package was acquired in Sterling's acquisition of Metro Mark.

Sterling's switch/host EDI processing software was developed in-house.

X.400 Plans

Sterling will accomodate X.400 and X.25 protocols when customers request it. The protocol's adoption is dependent on market conditions.

ISDN Plans

Sterling does not operate any telecommunication lines. It has no ISDN plans.

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Alliances

In 1987, the company signed a resales agreement with Telenet Communications Corporation (Reston, VA) whereby Telenet would private-label Sterling's processing service and distribute it to Telenet's Fortune 500 customers.

Since January 1990, Sterling began to market its services directly in Canada.

As of July 1989, Sterling signed Global VAN (Tokyo, Japan) as a reseller in Japan for Japan-North American EDI communications.

As of May 1989, Sterling signed ACI Computer Services and Telecom Australia as an EDI interconnect traffic facilitator for companies utilizing EDI with trading partners in Australia and the Pacific Rim.

Sterling has announced it will open Sterling Software International for EDI in Europe.

Global Software, Inc. (Atlanta), a subsidiary of the Hathaway Corporation (Broomfield, CO), which sells accounting and other business software for IBM mainframes and minis, is an agent for ORDERNET software and network services to Global's installed base.

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page 1 of 2

U.S. Fee Schedule

ORDERNET System

Electronic Data Interchange

STERLING SOFTWARE

These prices are effective October 1, 1988 and supersede all earlier pricing.

Service

Inter- and intra-industry value-added communications between participating senders and receivers of electronically transmitted trade documents.

Initialization Fee

A one-time charge due with the Service Agreement that is applied to communications testing, documentation and the attendance of two persons at an ORDERNET Services installation workshop $500.00

Monthly Base Fee

The monthly charge for each participant for mailbox service. The fee commences thirty (30) days after the first test transmission, or when testing is completed if earlier, and no later than 120 days from contract acceptance date. If one location is transmitting or receiving data for multiple locations only one base fee is applied .....

$100.00 per month per connected purchaser location

$200.00 per month per connected supplier location

Connect Time Fee

A per-minute charge for the time a user is connected (signed-on) to the ORDERNET Services EDI system ..... $ .45 per connect minute

Processing

Charges are assessed per packet (one or more documents of the same type from one sending location to one receiving location), and per 80-byte record within one continuous transmission .....

A. Data sent

1. Purchaser packet charge ..... $ 2.50 each
2. Supplier packet charge ..... $ 2.75 each
3. Invoice records above the 100-record packet minimum ..... $ .015 per record
4. Chargeback debit memo documents ..... No charge per record
5. Bid award and chargeback reconciliation records above the 100-record packet minimum ..... $ .015 per record
6. All other records above the 100-record packet minimum ..... $ .05 per record
7. Document charge ..... $ .10 each

B. Data received

1. Purchaser packet charge ..... $ 2.50 each
2. Supplier packet charge ..... $ 2.75 each
3. Invoice records above the 100-record packet minimum ..... $ .015 per record
4. Chargeback debit memo documents
   - 0 - 50,000 records ..... $ .03 per record
   - 50,001 - 100,000 records ..... $ .025 per record
   - 100,001 - and over ..... $ .02 per record
5. Bid award and chargeback reconciliation records above the 100-record packet minimum ..... $ .015 per record
6. All other records above the 100-record packet minimum ..... $ .05 per record
7. Document charge ..... $ .10 each

(Continued on back)

ORDERNET SYSTEM

Optional Services

A. High speed communications:

9600 bps	$ .55 per connect minute
(Rates for 56K bps or leased line communications will be quoted on an individual basis.)	$ 75.00 monthly surcharge

B. In-network format translations

A monthly charge assessed customers that require format translation with trading partners that *are* customers of ORDERNET Services.	$ 25.00 per month
Assessed customers that require format translation with trading partners that are *not* customers of ORDERNET Services.	
1. Packet charge	$ .50 per packet
2. Record charge	$ .01 per record

C. Off-network interconnect service

A monthly charge assessed to customers interchanging documents with companies that are not customers of the ORDERNET Services Network	$ 25.00 per month per interconnect (maximum of $100.00 per month)

D. Re-installation

An hourly rate charge covering costs associated with mailbox regeneration and retesting for existing customers resulting from their in-house systems and/or communications changes.	$ 50.00 per hour (minimum charge $75.00)

E. EDI/LaserMail℠ and EDI/Fax℠

Conversion of computer-readable EDI documents to human-readable printed form. All EDI/LaserMail℠ and EDI/Fax℠ charges are in addition to standard processing fees. (Postage and handling included in the EDI/Laser Mail℠ charges listed.)

1. Packet charge	$ 1.25 each
2. Records above the 100-record packet minimum	$ .025 per record
3. Document charge	$ .05 each
4. Out-dial charge (EDI/Fax℠ only)	$ .45 per connect minute

F. Mailbox dump and/or data restoration	$ 25.00 per request
G. Mailbox status report	$ 10.00 per request

H. Additional copies of documentation

User Guide	$ 50.00 each

I. Installation workshop

"How-to" seminar for system installation. Fee waived for initial attendance by new customers (up to 2 persons)	$150.00 per person

Discounts and Minimums

The monthly processing charges of a customer will be adjusted as follows:

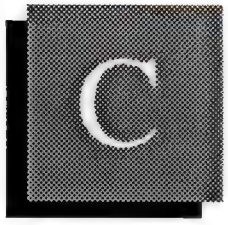
A. Minimum monthly charge

The minimum monthly billing per mailbox includes the base fee, processing fees, and connect time fees. The minimum does not apply during the first 30 days of "live" operation	$300.00 per month

B. Discount rates

Processing charges	Incremental discount
Less than $1,000	0%
$1,001 - $2,000	5%
$2,001 - $3,000	10%
$3,001 - $4,000	15%
$4,001 - $5,000	20%
$5,001 or more	25%

Discounts are applicable only when invoices are paid within current payment terms (net 15 days).



Appendix: Major Computer Hardware Vendor Profiles

180.5

INTERNATIONAL BUSINESS MACHINES CORPORATION
Whiteplains, NY
(813) 878-4374

EDI Contact: Lisa Mandell, Manager, EDI Solution Center; John Kapinos, Marketing Development Manager, EDI Solution Center

The Company

IBM is the largest computer manufacturer in the world.

EDI Offering

Hardware

IBM does not make EDI-specific hardware.

Software

IBM's "expEDIte" series of EDI software provides data format translation between a company's internal applications and standard EDI formats. The expEDIte series covers the basic IBM platforms: MVS mainframes, midrange System 3X and AS/400s, OS-2 systems, and MS-DOS systems. IBM manufactures the mainframe and OS-2 systems. It resells third-party software with the IBM label on it for the midrange and MS-DOS software.

To provide network communication for the expEDIte software, IBM offers the Communicator Series of software. The series covers the line of IBM platforms. Communicator software connects IBM equipment to the IBM Information Network only.

IBM shipped its first in-house developed expEDIte software product, the MVS product, in the Fall of 1989. It announced its OS-2 product in February, 1990. In April 1990, it announced its MS-DOS product.

Third-party EDI software vendors make software for IBM computers. Leaders in the mainframe platform category are Sterling Software (320 installations), Transettlements (100), and EDI Solutions (50).

Leading PC vendors are Supply Tech Inc. (1,200), EDI Inc. (100s),

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DNS (700), Foretell (unknown), and The APL Group (unknown).

The leading IBM mid-range third party software vendor is ACS Network Systems (100s of installations).

Consulting

IBM's Systems Integration division offers custom consulting to customers.

Also, its "QuickEDI" program is a comprehensive package for small "spoke" companies to implement EDI with a large "hub" company. IBM installs PC software with the hub company's technical requirements (for communications, transaction sets, product codes, etc.) already programmed. Annual maintenance is also included.

Education

IBM's Systems Integration and Professional Services group (based in Dallas, TX) provides two-day long educational seminars on EDI.

Costs for the seminars are $550 per attendee.

Present and Future EDI Strategies

IBM wants to position itself as a major EDI player and sees EDI as a strategic product offering.

It characterizes EDI as one of three major "inter-organizational systems" that it expects will become key systems/applications in the 1990s. These are electronic mail systems, online transaction processing systems, and EDI.

IBM is in a good position in that it offers to the EDI customer hardware, software, a network and professional services.

IBM wants to go after large corporations who are already doing EDI but are dissatisfied with either their EDI software or network services.

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Pricing

IBM charges two basic fees for the EDI software it offers. The Primary License Charge (PLC) is the initial, one time cost of the software. The Annual License Charge (ALC) is the ongoing annual license fee for the use of the software.

Platform	*PLC*	*ALC*
OS/2	$4,000	NA
System36	$7,260	$990
System38	$12,370	$1,705
AS/400	$7,260-$19,960	$990-$2,720
MVS	$14,750-38,000	$2,050-5,200
MVS 3090	$34,215-45,620	$4,661

Market Share

Of the $12.5 million IBM made on EDI in 1989, all except for about $500,000 was made through its network services. The $500,000 was earned from approximately 15 to 18 installations of its MVS mainframe product, which first shipped in the Fall of 1989.

Consequently, IBM has a negligible share of the translation software market.

Relation with Service Providers

IBM is a network service provider (see profile) in addition to a provider of hardware and software. Consequently, it intends to couple its sales of hardware and software to sales of its network services (and vice versa).

IBM's only relationships with other service providers is through interconnection services.

Users

Not divulged by IBM.

Protocol Support

IBM's expEDIte translation software uses Communicator software to connect with the IBM Information Network. Communicator software and the Information Network use IBM's proprietary SNA (Systems Network Architecture) protocol.

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EDI Supported

IBM software supports all standard EDI data formats including X12, EDIFACT, TDCC, UCS, and WINS.

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DIGITAL EQUIPMENT CORPORATION
Maynard, MA
(603) 884-2253

EDI Contact: William Carlisle
EDI Product Manager
Total Employees: 124,000
Total Revenue, 1989: $12 billion

The Company

Digital Equipment Corporation (DEC) is the world's second largest computer manufacturer after IBM.

EDI Offering

Software

DEC released its first EDI product in 1988 called VAX/EDI for distribution in the United Kingdom only. The product is intended to carry over until DEC prepares a full featured EDI software/hardware product.

DEC expects to release a full featured EDI software package in the second quarter of 1990.

The planned EDI product, called DEC/EDI, runs on DEC VAX computers only, on single or networked platforms.

Consulting

Along with the software release, DEC will offer systems integration consulting (to help customers plan, design, implement and manage their EDI programs). DEC will use third party consultanting companies for this.

DEC will offer trading partner consulting whereby experienced DEC EDI implementors will consult with companies to bring up trading partners.

Through third-party value added networks (VANs), DEC will offer network-connection support.

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Present and Future EDI Strategies

DEC recognizes that hardware is increasingly becoming a commodity business with low profit margins. Consequently, it is positioning itself to be a major provider of software and systems integration. DEC views EDI as a major component of this new strategic direction.

The DEC/EDI product is designed to work in a highly networked environment. It has three main components: an application interface, a translator, and a communications package. Each component may run on separate VAX platforms.

DEC's architecture allows a company with dispersed applications to use centralized EDI translation and communications resources.

Pricing

Although the product has not been released at this writing, pre-released price points for the product are:

For a "low-end" configuration (MicroVax): $4,000-6,000

For a "hi-end" configuration (VAX 9000): $40,000-80,000

Market Share

DEC has no direct market share in North America.

Relation with Service Providers

DEC is forming alliances with GEIS, BT Tymnet, AT&T, and Telecom Canada with possibilities for more. These alliances have each party merely recommending each other's products to customers. The service providers also will help connect customers using DEC software to their networks. The providers will be knowledgeable about DEC's architecture.

Users

The sole user of the DEC/EDI product is DEC itself, particularly in its Augusta, ME manufacturing facility.

Protocol Support

DEC/EDI works in conjunction with DEC's Network Application Support (NAS) architecture. NAS is designed to run in mulit-vendor, multi-VAN environments. Thus, it supports widely used communications protocols including X.400.

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EDI Supported

DEC/EDI is intended to support all store-and-forward kinds of EDI. It supports standard EDI (X12, EDIFACT, etc.) as well as proprietary EDI.

It is designed for a store and forward architecture since application interface, translator, and communications with the VAN are handled in different program modules.

Real time VAN communication may be possible (via ISDN) but not real time between application and VAN.

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EDI HARDWARE VENDOR PROFILE

TANDEM
19191 Vallco Parkway
Cupertino, CA 95014
(408) 285-6000

EDI Contacts:
Gail Graziano, Manager EDI Marketing
Total Employees: 9,500
Total Revenue, 1989: $1.633 Billion

The Company

Tandem is a leading manufacturer and marketer of fault-tolerant computer systems and networks for on-line transaction processing, and large data base and mainframe applications using the Guardian or UNIX operating system.

EDI Offering

In April 1990, Tandem launched its first major EDI offering. "NonStop EDI" includes computing hardware, message switching software and translation software, and alliance partners capable of implementing vertical market-specific EDI applications using Tandem hardware.

EDI Software

In April 1990, Tandem also announced a development and distribution agreement with MPACT*EDI Systems. MessageWay and XWay, MPACT's EDI software products, run on Tandem NonStop systems. Under the terms of the agreement, Tandem will distribute MessageWay and XWay software worldwide through specific Tandem Alliance members that will become EDI Implementers. In addition, Tandem and MPACT will jointly develop specifications to enhance future versions of the software.

MessageWay is a high-volume message management system that facilitates the automatic company-to-company electronic exchange of structured business documents such as purchase orders, shipment documents and invoices. XWay software translates electronic messages between public, industry, and proprietary EDI document transactions.

Consulting, installation, education/training, sales, and user start-up procedures will all be provided by Tandem's third-party implementers who have not yet been publicly announced (negotiations are in process).

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Customer Base

User Characteristics

- Manufacturing, financial services, retail/distribution, telecommunications, transportation, pharmaceutical industries

Key Users

- Targeting Fortune 500 internal (private) EDI networks
- Value-added EDI network service providers

Other Related Business

Local-area network systems (Ungerman-Bass acquisition) and mainframe and PC computer security systems from Atalla.

EDI Organization

Tandem has a single EDI group in the Industry and Application Marketing organization in Corporate. It has three departments (marketing, product and project management) staffed by approximately ten people.

EDI Strategy

The company is using a combination of direct and third-party EDI offerings to promote the use of Tandem hardware in EDI applications by providing control and flexibility to the end user.

Marketing

Market Target

- Targeting Fortune 500--just starting with new program.

Perception of Competitors

- Tandem doesn't see itself as having direct competitors with its unique approach.

Pricing

- Not available--will be published by third-party EDI implementers.

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Switching Systems

Hardware Systems (the standard Tandem product line)

- NonStop Cyclone™--An on-line mainframe that features 4 to 16 high-performance processors, handling mixed workloads of on-line transaction processing (OLTP), query, and batch jobs simultaneously. NonStop Cyclone is fully compatible with other NonStop systems.

- NonStop VLX™--A high-performance system that is the entry point to mainframe computing. The VLX is expandable from 2 to 16 processors.

- NonStop CLX™--A midrange system that expands from 2 to 8 processors and can be used as a standalone system or as distributed nodes in a Tandem network.

- Integrity S2™--The first fault-tolerant, high-performance UNIX® System V computer that is based on RISC technology.

Software

EDI messaging utility software is designed to take maximum advantage of Tandem's NonStop system architecture. EDI message management and translation are governed by system processes that can be updated without interrupting system operation. As a result, maintenance of new trading partners, message-routing instructions, mailbox changes/additions, standards updates, communications changes, and hardware upgrades can all be made to the system without impacting existing operations. The system is always available to trading partners regardless of time of day, day of the week, or maintenance schedules.

MPACT EDI Systems, a Tandem alliance partner, provides message management and translation software for medium- to large-scale EDI systems. MessageWay (message management) with the Xway (translation) option is available today. Another MessageWay utility provides a bridge to applications. (MPACT EDI Systems was previously known as Merit Systems.)

MessageWay's data acquisition modules are written in Tandem's Transaction Application Language (TAL™) taking advantage of processing efficiencies inherent in that language. The software features a table-driven approach to defining network options, allowing updates and modifications to the network configuration tables without interrupting message processing. MessageWay provides flexible addressing capabilities that permit users to separately schedule and control when messages are delivered to

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internal trading partner applications or to external trading partner electronic mailboxes, either directly or through third-party networks.

Protocols

Protocols Supported

- Tandem supports a variety of data communications protocols for EDI applications, including Bisynchronous 2780/3780, Generic BSC, RJE and HASP, various asynchronous protocols (X Modem, Y Modem, and character streaming), IBM's System Network Architecture (SNA) 3770, LU 6.2 and LU 0, plus X.25 packet-switching network protocols. Tandem currently offers an OSI protocol up to and including OSI level five.

Future Protocol Support Plans

- Tandem is actively developing a full stack OSI protocol software product.

Data Formats

Data Formats Supported

- Application and industry-specific data formats will be provided by third-party implementers.
- XWay, from Tandem's partner MPACT, is a solution for translating in-house files into EDI standards and EDI documents into in-house applications. Xway supports all ASC X12 formats and derivatives, as well as EDIFACT. Trading partner and transaction set formatting are dictionary-driven and can be defined while the system is on-line. XWay provides a perfect means to meet any company's need for EDI translation.

Future Data Format Support Plans

- Plans depend on the third-party implementers (they will use Non-Stop EDI software utilities).

Source of EDI Technology

All sources are third parties and this situation is expected to continue.

MHS Protocol/X.400 Plans

Tandem, through the MPACT alliance, will probably support X.400 as part of its intent to eventually offer interactive EDI capabilities.

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ISDN Plans

Tandem and AT&T signed a Memorandum of Understanding (MOU) in 1988. The nonexclusive MOU calls for AT&T to provide Tandem with ISDN technical counsel, test and certification facilities, and to assist in market research and joint marketing programs. Tandem has agreed to develop and deploy ISDN interfaces (BRA and PRA) for Tandem hosts and workstations that interface with the AT&T 5ESS switch, and to work with AT&T, customers, and third-party software providers to implement new OLTP applications that leverage ISDN benefits.

AT&T's goal is to promote the sale of 5ESS Central Office Switches by enhancing the ISDN capabilities and applications that can be offered to customers. Tandem's goal is to provide an OLTP platform with ISDN connectivity to take advantage of a new generation of applications offered by ISDN. AT&T markets to Regional Bell Operating Companies (RBOCs) and local/interexchange/international carriers. Tandem's target customers are the Fortune 500 companies and new users that need the advantages of Tandem fundamentals due to their wide-area networking capabilities and OLTP application opportunities offered by ISDN.

The ISDN marketing program involved partnering with a number of participants to develop applications for ISDN. The partners are the switch providers (currently AT&T), the RBOCs (with whom Tandem is developing both formal and informal relationships) and other telecos, the third-party Alliance Software vendors who will be developing the ISDN applications, and the customers. None of the partners in this group can deliver a full solution to the user without the other members' participation in identifying applications and their dedication to creating and delivering them.

Alliances

Government Relationships/Contracts

Some government contracts exist but have not been made public.

Joint Ventures/Licenses

- North America--This is Tandem's current area of focus in launching "NonStop EDI"
- Europe and Japan--"NonStop EDI" will be launched in 1991.

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194

STRATUS COMPUTER, INC.

Marlboro, MA
(508) 460-2796

EDI Contact: Richard Jacobson, Group Manager, File Systems
Robert LaBarbera, Business Partner Liaison

The Company

Stratus Computer, Inc. supplies the XA2000 family of continuously available, fault-tolerant computer systems for on-line transaction processing and communications control. The XA2000 (with Stratus' VOS operating system) is used widely by banks and manufacturing companies. Its 1989 revenues were $342 million and has installed approximately 4,500 Stratus computers.

EDI Offering

Stratus has allied with EDI software maker, EDI Solutions Inc. (Minneapolis, MN). Together, the two companies provide hardware/software EDI solutions to customers.

Hardware

Stratus uses its XA2000 family of transaction processing computers to be the hardware platform for EDI systems.

Software

Through a business partner relationship, Stratus uses the EDItran software from EDI Solutions Inc. to run on its hardware. The EDI Solutions label is kept on the product. (Stratus does not make EDI nor other kinds of application software of its own.)

Consulting

Stratus, in conjunction with EDI Solutions, offers customers two full days of installation consulting with a system purchase.

Education

Stratus has initiated a market education program for its existing XA2000 customers to educate them about EDI.

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Present and Future EDI Strategies

Stratus is second to Tandem in the fault-tolerant, online transaction processing computer market. Stratus computers are designed for other computing devices (computers, terminals, etc.) to telecommunicate with them. Stratus computers have multiple ports, are highly secure, and can handle large volumes of real time processing traffic.

Stratus sees EDI as favorable to its product's capabilities. As EDI is interconnection of companies, Stratus believes that its computers could function as front end processors/gateways for the messaging traffic that flows between companies. In fact, Stratus has suggested that companies who conduct EDI on its computers can bypass third party VANs and simply have trading partners send messages directly to the company. The Stratus computer acts as the companies own private communications switch. Even if used in conjunction with VANs, the Stratus computer can be positioned as a front-end processor to applications, off-loading the EDI processing functions from the hardware that runs applications.

Stratus sees EDI functionality in its machines as one component of an overall corporate communications capability. It wants its machines to act as an all purpose gateway for data communications among different platforms/applications within a company as well as well as communications between the company and outside sources (third party networks, terminals, automated teller and point-of-sale machines, etc.).

Stratus wants to leverage its dominant position in the financial services/EFT marketplace. It sees EDI as a highly complementary product to its customer base, expertise, and business partner relationships with software vendors.

Because of its expertise and customer base in transaction, real time processing, Stratus is looking for opportunities in developing real time applications of EDI. Company spokespersons have suggested that large EDI users will want to get away from the store-and-forward model of EDI and move into real time, application-to-application data communication.

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196

Pricing

Prices for the EDItran software from EDI Solutions that runs on Stratus computers is tiered according to processor type and other hardware features. Cost of the software is broken into two components, an initial purchase fee and an optional annual maintenance fee. Maintenance includes software maintenance as well as upgrades to EDI data standards as they are released.

The initial purchase price for EDItran software for Stratus ranges from $18,000 to $27,500. The annual maintenance fees range from $2,400 to $3,700.

Market Share

Stratus just announced its alliance with EDI Solutions (and, thereby, its entry into the EDI market) in December of 1989. Consequently, it has a negligible market share

It has installed EDI programs in four large sites.

Other Telecommunications Products

Stratus offers other telecommunication products for its machines through business partner relationships with third-party software developers. Altogether Stratus maintains approximately 175 business partnerships.

Two products relate to EDI:

Network Express, by Scientific Software (Atlanta, GA) is a message switching/communications product. It routes incoming data streams from disparate machines (including ATMs, mainframes, dumb terminals, and PCs) to applications running on backend processors.

EFT software from Shared Financial Systems (Dallas, TX). This software is used primarily by banks and retailers for ATM/POS processing and credit card authorization.

Relation with Service Providers

Stratus has just begun to identify potential relationships with network service providers. It is focusing on selling its hardware as switching platforms. Stratus built the switch for the railroad service provider, Railinc (Washington, DC).

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Users

Stratus' key users to date are Lufthansa (Stratus computers run the MOSAIC cargo tracking system), Railinc (the railroad EDI service provider), ATC (a trade-documentation processing company in Los Angeles), and Stratus itself (which does EDI with Texas Instruments).

Protocol Support

Data can be sent or received from any other computer directly by using standard data communications protocols, including RJE 3780/2780, SNA or X.25.

Stratus will customize packages to best suit a customer's file transfer needs.

EDItran software is designed to be compatible with all third-party networks.

EDI Supported

Stratus computers running EDItran software supports ANSI X12, TDCC, UCS, WINS, and EDIFACT data formats.

Implementing new versions of standards or new standards is part of the software design. Stratus/EDI Solutions provide complete standards tables and supporting code as draft standards are issued.

Stratus is monitoring the developments in real-time EDI applications (which, today are few). It is looking at developments in ISDN usage and how EDI can be used in an ISDN context.

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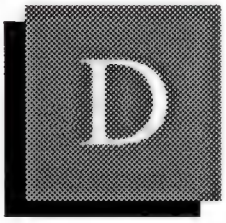

Appendix: Major EDI User Profiles

1985

EDI USER PROFILE

WELLS FARGO & COMPANY
San Francisco, CA
(415) 477-1011

EDI Contact: Roxanne Ivory
EDI Project Manager

The Company

Wells Fargo is one of the largest banks in the state of California.

Functions and Formats

Wells Fargo is both a user of EDI and a service provider of EDI (payment services using the ANSI X12 820 standard). This profile concentrates on Wells Fargo as a user.

Wells Fargo receives electronic invoices from eight of its largest suppliers. Six of the suppliers send them in the X12 810 format, two of them send them in proprietary formats.

Wells Fargo plans to initiate purchase orders (the X12 850 format) in 1990.

Quantity of Data, Growth, Trends

Approximately 70% of Wells Fargo's dollar value of invoice billings are received by EDI ($500,000-$600,000 per month).

The first EDI transmissions began in March 1989.

The program has been moving very slowly, according to Ivory. Upper management at the bank is not educated about EDI. Also, Wells Fargo has had to spend time educating its trading partners.

Settlements

Wells Fargo is not electronically paying its suppliers. There are not plans for EFT at this time.

Cost-Benefit Impact

No impact study has been performed. All that Ivory could say was that it has been good that trading partners have decided to use the X12 standard (and not their own proprietary standards).

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International, Japanese, and Government Relationships

Wells Fargo does not conduct EDI with any of these groups. (note: As a service provider, Wells may perform EFT payment/collection services for these groups. But as a user it does not conduct EDI with any of these)

Implementation Phases and Problems

There has been no central EDI plan at Wells Fargo. EDI is a low priority item. Upper management is not interested in EDI.

Processing Sequences

Various business units of Wells Fargo originate (paper) purchase orders. Suppliers place invoices for these orders on either magnetic tape or diskettes and send them monthly to Wells.

A in-house developed database application extracts the data from the invoices and updates Wells' General Ledger.

Consolidated paper invoices are printed and sent to Wells' accounts payable department where a paper check is cut.

Expenses are charged to each business unit for the processing of the invoices.

Network Services Used

Wells Fargo does not yet send the EDI messages over a network (it sends them on magnetic tape and floppy diskettes which are delivered by courier).

Nevertheless, Wells has contracted with GEIS for future EDI network services. It has used GEIS to perform data format compliance tests with its trading partners.

Configuration

Wells Fargo's processing of EDI messages is performed on an IBM 3090 VM-CMS mainframe. The software is built from a fourth generation programming language called NOMAD.

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SOCIETY FOR WORLDWIDE INTERBANK FINANCIAL TELECOMMUNICATIONS
Headquarters: Brussels, Belgium
New York City office
(212) 558-6920

Donald Andersen
Account Representative
Total Employees: 1000

The Company

The Society for Worldwide Interbank Financial Telecommunications (SWIFT) is a proprietary data communications network owned and controlled by 1,600 member banks from 70 countries throughout the world. SWIFT has offices in Brussels (headquarters), New York, Rio de Janeiro, London, Hong Kong, Tokyo.

Functions and Formats

SWIFT was established to facilitate the communication of transaction-related messages among banks of different countries. SWIFT is not a payment/funds-transfer system.

SWIFT member banks have developed proprietary message formats that serve a variety of functions including, bank-to-bank payment instructions, payment instructions for bank customers, foreign exchange transaction instructions, collections, trading instructions for securities, bank-customer statements, and others.

SWIFT message formats are tightly defined so as to allow computer processing by the receiving bank/institution.

Quantity of Data, Growth, Trends

SWIFT is moves 1.2 million messages per day.

SWIFT's message volume is increasing 20% per year.

The major banks of the industrialized world belong to SWIFT. SWIFT is now targetting bringing more lesser developed countries into its membership to expand its geographic reach. Its most recent nation member is Papua New Guinea.

Settlements

SWIFT is not a funds transfer network.

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Cost-Benefit Impact

Difficult to calculate. Without SWIFT, banks would use a variety of communication media (telex, telephone, post). In an increasingly global financial community, timeliness of communication, such as that provided by SWIFT, becomes mandatory. Banks could not operate without it.

International, Japanese and Government relationships

Approximately 1,600 banks from 70 countries belong to SWIFT. Many large Japanese banks belong to SWIFT.

Implementation Phases

To join SWIFT, a banking institution applies for membership to the SWIFT user group in its country.

The user group (other SWIFT bank members) reviews the application and determines if the applicant meets the qualifications of being a bank.

The review process typically takes one year to complete.

If approved, technical training and system testing is done.

Member banks must pay a joining fee, an annual membership fee, and a network per-use fee.

Processing Sequences

Varies according to institution and message function. Messages can be both application-to-application as well as free-text, human readable.

Protocol

SWIFT uses a proprietary protocol to connect bank members to its two switch nodes.

It is in the process of converting over to a SWIFT II system that will employ the X.25 packet switched protocol.

Network Services Used

SWIFT has built in security and redundancy mechanisms in its network.

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Configuration

SWIFT is a proprietary network consisting of leased lines and satellite connections, and two switching computers (one in Europe, one in the United States).

SWIFT uses Unisys computers for its switches. Software was developed by Unisys and SWIFT engineers.

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EDI USER PROFILE

MERVYN'S
Hayward, CA
(415) 786-8640

EDI Contact: Steve Koppich
MIS Manager

The Company

Mervyn's is a mid-scale, popular-priced, value-oriented deapartment store that currenly operates over 200 stores in 14 Western and Southern states. Its stores feature nationally branded and private-label apparel, accessores, and household soft goods. Mervyn's is one of four main subsidiaries of Dayton Hudson Corporation. 1989 sales were approximately $3.2 billion.

Functions and Formats

Mervyn's has been a pioneer user of EDI in the retail industry.

It has over 500 suppliers using EDI, mostly clothing manufacturers and some transportation vendors.

Mervyn's currently uses the following X12 standard data formats:

purchase order (850)

invoice (810)

advance ship notice (856)

product transfer advice/sales data (867)

inventory advice (846)

It uses the last two transaction sets only with a few large suppliers. Mervyn's uses the 867 to send point-of-sale data on a certain vendor's merchandise to that vendor. The vendor can better advance plan production with it.

Vendors use the inventory advice to tell Mervyn's what merchandise it has available to be immediately shipped.

Trends, Quantity of Data, Growth

Seventy five percent of all purchase orders that Mervyn's generates is done via EDI.

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Mervyn's growth in EDI trading partners since Spring of 1989 has been 100%.

Settlements

Mervyn's does not electronically pay its suppliers.

Cost-Benefit Impact

Mervyn's is in the process of measuring the cost/benefit of EDI. It says that comparing the cost of preparing purchase orders in paper mode versus EDI mode is not an accurate measurment. The more important benefit is the better use of information that EDI allows. With EDI, Mervyn's can order goods nearer the time that its customers will buy them. Less inventory costs for Mervyn's and, overall (due to no stock outs), higher customer satisfaction.

International, Japanese, and Government Relationships

It does not conduct EDI overseas, but may do so by Spring of 1991.

It does not do EDI with the government. It is considering paying taxes via EDI/EFT (the X12 820 transaction set).

Implementation Phases

Mervyn's has taken a very aggressive approach to impmenting EDI. It has threatened its suppliers to discontinue business if they did not adopt EDI.

It has helped its suppliers, however, by holding supplier education seminars where Mervyn's explained EDI.

Processing Sequences

Buying for all store outlets is done by corporate headquarters. A single purchase order, however, will have the vendor deliver to many different locations.

Protocols

Unknown.

Network Services

Monthly reporting (indicating the costs of particular transaction sets; the most frequently used transaction sets; other analysis of EdI traffic)

Compliance checking (the VAN checks data fields on each EDI transmission before allowing Mervyn's computers to process)

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Interconnection with other networks.

Occasional use of UPC catalog (to look for UPC codes that Mervyn's price look-up databases don't recognize)

On-network translation is not used

Configuration:

Mervyn's has 220 stores, 4 distribution centers and a centralized buying office in Hayward, CA. Mervyn's employs 60 buyers.

All communications with suppliers (POs, invoices, and ASNs) are conducted via the centralized buying office. The D.C.s and stores are told what will be delivered through Mervyn's own networked MIS.

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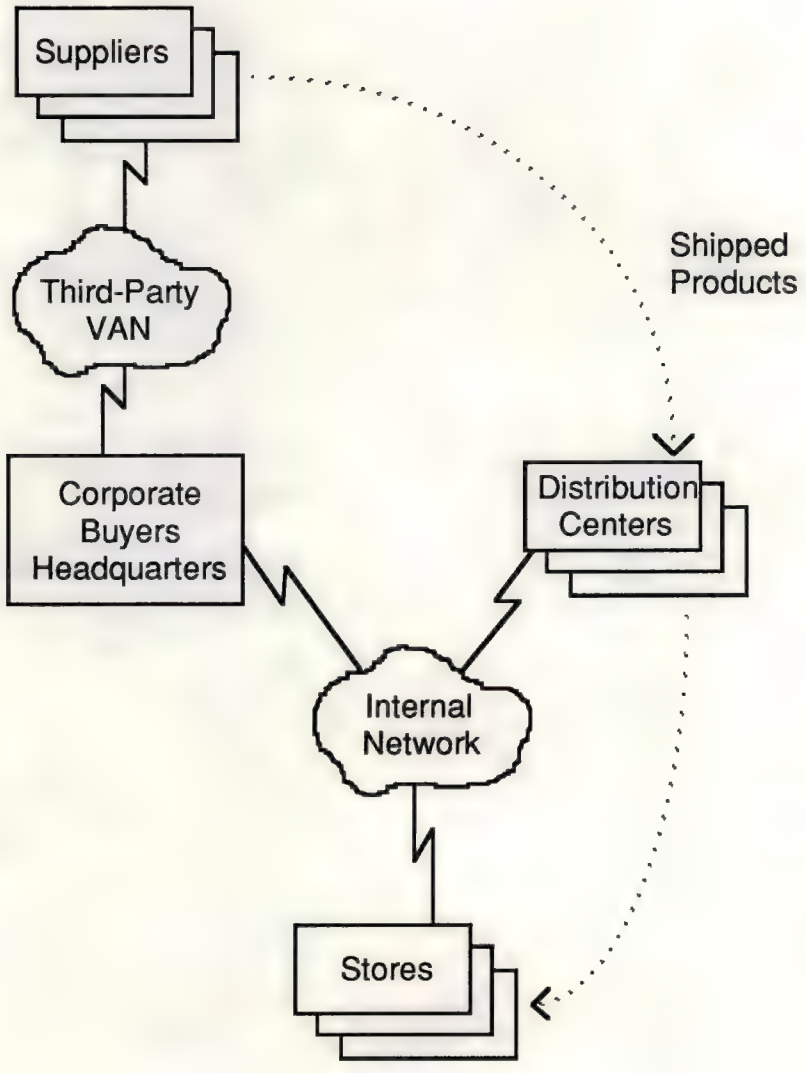
Mervyn's


Suppliers
Third-Party VAN
Corporate Buyers Headquarters
Shipped Products
Distribution Centers
Internal Network
Stores

EDI USER PROFILE

LEWIS GALOOB TOYS, INC.
San Francisco, CA
(415) 952-1678

EDI Contact: Karen Abe,
Data Processing Manager

The Company

Lewis Galoob Toys is a privately held distributor of toys. Its principal market is the United States, however, it has a minor overseas sales force. It has a sister company based in Hong Kong which acts as a buying office from Asian based toy manufacturers and contractors. INPUT estimates its 1989 sales to be approximately $250 million.

Functions and Formats

Galoob Toys conducts EDI with its seven largest customers, who are large nationwide mass merchandise chains (Wal-Mart, K mart, Toys R Us, Target, Hills, and Service Merchandise).

All of these customers send Galoob EDI purchase orders using the X12 format except K mart, who uses its own proprietary format.

In some cases, paper purchase orders are received from these customers.

Four of these customers are able to receive X12 invoices from Galoob.

Quantity of Data, Growth, and Trends

Altogether, Galoob receives approximately 75% of its purchase orders electronically.

This is a substantial growth from the same period last year when no EDI was being conducted at Galoob. However, Galoob representative says that EDI implementation is going slower than expected. (They have had trouble sending invoices to some of their customers.)

Galoob is starting to receive point-of-sale data from Wal-Mart in a non-standard, flat file format. This data allows Galoob marketing and sales personnel to identify fast selling products and make appropriate plans.

Galoob does not do any EDI with its sister company in Hong Kong

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or any other supplier company.

Settlements

Galoob sends records of all its invoices to the First Bank of Boston electronically. The bank performs collection and factoring services. In the toy industry, many buyers pay toy makers/distributors once a year (in December). Thus, banks play a critical role in maintaining a company's cash flow. Eighty percent of Galoob's collections are done by 1st Boston.

Galoob's customers do not pay electronically.

Cost-Benefit Impact

Galoob has not quantified any cost-benefit impact.

International, Japanese and Government Relationships

Galoob is not conducting EDI with any international trading partner, a Japanese company nor the U.S. government.

It has outlets in Japan and a sister company in Hong Kong. Galoob has no plans at this time to use EDI with these locations.

Implementation Phases and Problems

Galoob has implemented EDI at the request of its largest trading partners.

Galoob operates parallel paper and EDI purchase order processing tracks when first starting EDI with a trading partner. When the EDI system is secure, it drops the paper track.

Galoob has had trouble implementing the invoice with K mart stores. K mart reported that it wasn't receiving the invoices that Galoob sent.

Processing Sequences

An incoming electronic PO is translated by the ACS software. An edit list is created/printed for the sales/service staff to check. (They insure that the customer is using the correct prices and otherwise checking the integrity of the order.)

Once approved by the sales staff, the order is forwarded onto the order file system (a Pansophic PCR package).

From here it is batched with other hand-entered orders and sent to the warehouse. When the delivery date matures, a picking slip is

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printed out. Warehouse clerks use the slip to gather and pack the PO items to ship. Once they have shipped the order, the clerks log onto the system which creates an invoice. For those customers who can receive electronic invoices, the invoice record is sent to the translator, converted to the X12 invoice format, and then sent out to the customer.

Protocol

Galoob uses 3780 protocol to communicate externally.

Network Services

No special services used of its networks. Just store-and-forward mailboxing.

Configuration

All of Galoob's processing is done on an IBM System 38. It uses translation software from ACS Network Systems, Inc. (Concord, CA).

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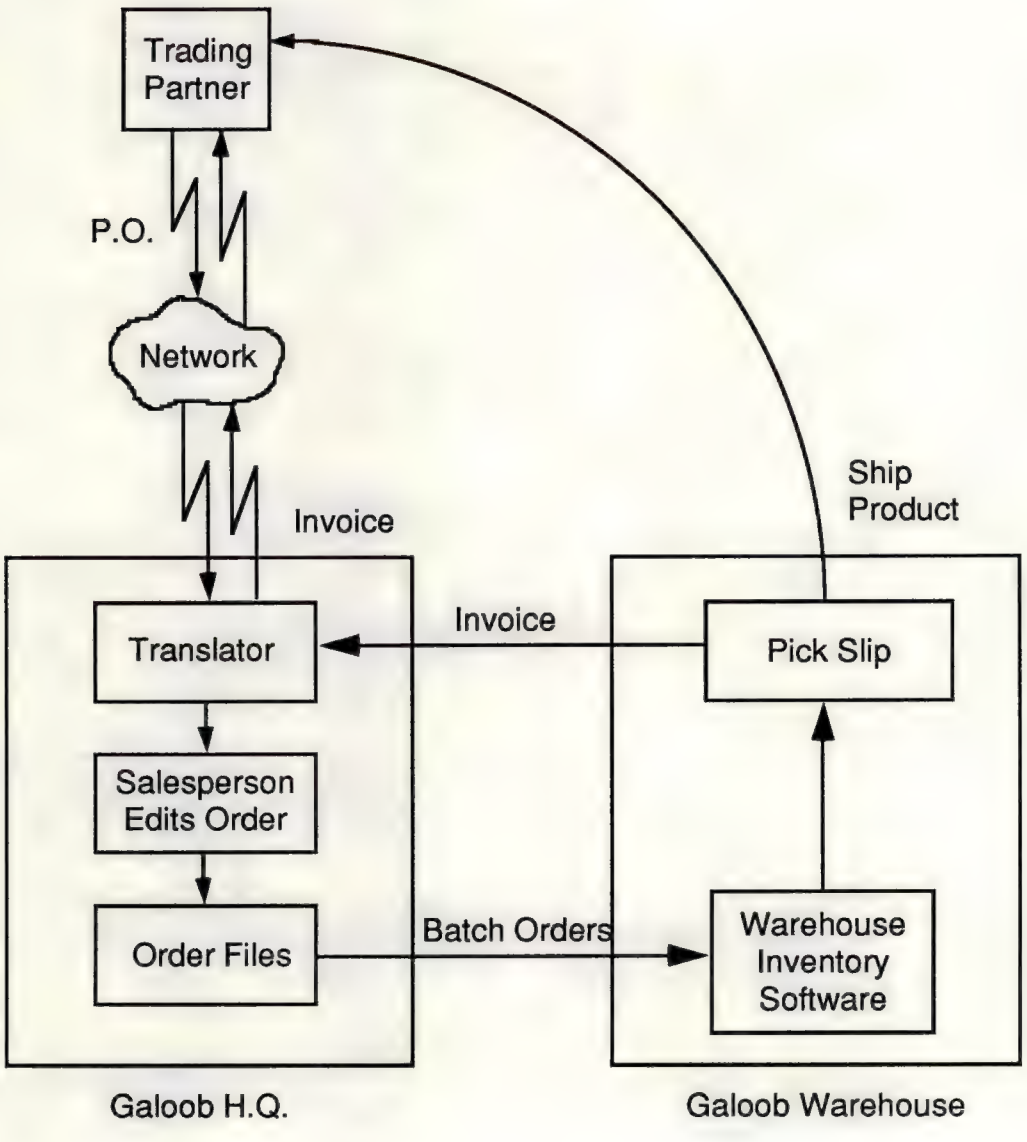
Lewis Galoob Toys, Inc.



YW-VED

INPUT

HERCULES INCORPORATED

Hercules Plaza
Wilmington, DE
302-594-5000

EDI contact: Keith Smith, Director of Purchasing; Ann Foote, Director, Data Processing
1989 revenues: $3.1 billion

The Company

Hercules Incorporated is a chemical manufacturer with 42 plants in the United States. It manufacturers and sells products abroad to a small extent.

Functions and Formats

Hercules uses EDI with both its suppliers and customers.

Suppliers: Hercules conducts EDI with 26 of its vendors at this time.

Hercules uses the X12 transaction sets for the purchase order (850) and purchase order acknowledgement (855).

Seven of its plants conduct EDI; 35 have yet to adopt.

Customers: Hercules conducts EDI with seven of its customers.

It receives the following X12 transaction sets: purchase order (850), purchase order change (860), planning schedule (830).

It sends the following X12 transaction sets: purchase order acknowledgement (855), purchase order change acknowledgement (865), invoice (810), and the advance ship notice (856).

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Trends, Growth, Quantity of Data

Hercules started conducting EDI in early 1989.

Hercules has brought up 26 supplier companies in 16 months.

The number of EDI transaction sets exchanged with its customers is increasing 10-15% per month.

In one of its plants, 60% of its storeroom inventory items are purchased via EDI.

Future plans at Hercules are to first install EDI buying capabilities at all of its plants.

Then it wants to expand EDI into the transportation department starting with freight bill transactions.

Then it wants to use more transaction sets including material safety data sheets, certificates of analysis, and certificates of compliance.

Finally, Hercules' ultimate goal is to implement invoices and electronic payment.

Settlements

Hercules does not pay suppliers electronically.

Currently, Hercules shipment-receiving practices do not capture and report back to central finance the receipt of goods delivered. This receipt data is reported by the plants to the central finance on a monthly basis. This receipt data must first be automated before Hercules will implement an EFT mechanism. Building an automated receipt system is the goal for 1990. It will be the springboard for electronic payments to vendors.

Cost-Benefit Impact

In the plants that have implemented EDI:

- turnaround time from order placed to order received has been reduced from 10 days to 3 days.

- order handling costs have dropped from $7.50 per order to $.25 per order.

- inventory holdings have dropped in dollar value by 4.1% or $945,000. Another two million dollars in inventory savings are expected by year-end 1990.

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Total purchasing personnel at Hercules has been reduced from 47 to 27. The productivity of the remaining personnel (as measured in dollars purchased by employee) has risen by 40%.

International, Japanese, and Government Relationships

Hercules is not conducting EDI overseas, with Japanese companies or with the government although it has customers under all three categories.

Implementation Phases and Problems

Hercules drew up a single supplier legal agreement pertaining to EDI and distributed it to all its plants.

A team consisting of a local plant inventory supervisor, computer expert and general manager worked with a purchasing manager from corporate purchasing.

As Hercules installed an EDI capability in its plants, it required suppliers of that plant to develop an EDI capability.

Processing Sequences

Purchasing: Buyers at plants use the local mainframe-based purchasing system. The system creates flat files for all purchases (EDI and non-EDI) and sends the files to a central corporate processing center. The central processing center pulls out the orders for those suppliers who can accept EDI and sends them to a central translator. The translator places the flat files into X12 standard formats and sends them over to Kleinschmidt.

Customers: Purchase orders come in to a central order-entry system. From the order entry system, they are sent out to the appropriate plants. Data fields for ship-to address and product type determine which plant will ship the product.

When the product is shipped, the warehouse clerks record the items shipped and purchase order. This data is communicated back to the corporate data processing center. An EDI advance ship notice is created for those customers who are able to receive one.

Protocols

Hercules uses SNA to connect with its VAN. It uses RJE to telecommunicate among its plants.

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Network Services

Hercules uses Kleinschmidt.

Kleinschmidt is interconnected with seven other networks. Many of Hercules' trading partners are on these other networks.

Hercules receives print outs every week from Kleinschmidt telling what EDI messages were sent, received and are pending. The reports are useful for tracking message traffic between networks.

Configuration

Each of the seven plants that are conducting EDI use an HP 3000 mini computer. The HP runs both purchasing and inventory software. These software packages send and receive data with Hercules' central data processing center which uses an IBM 3090 mainframe. The central data processing center runs a translation package and communicates with the third party VAN. All EDI traffic runs through the translator and corporate data processing center. Flat batch files are communicated between plants and DP center.

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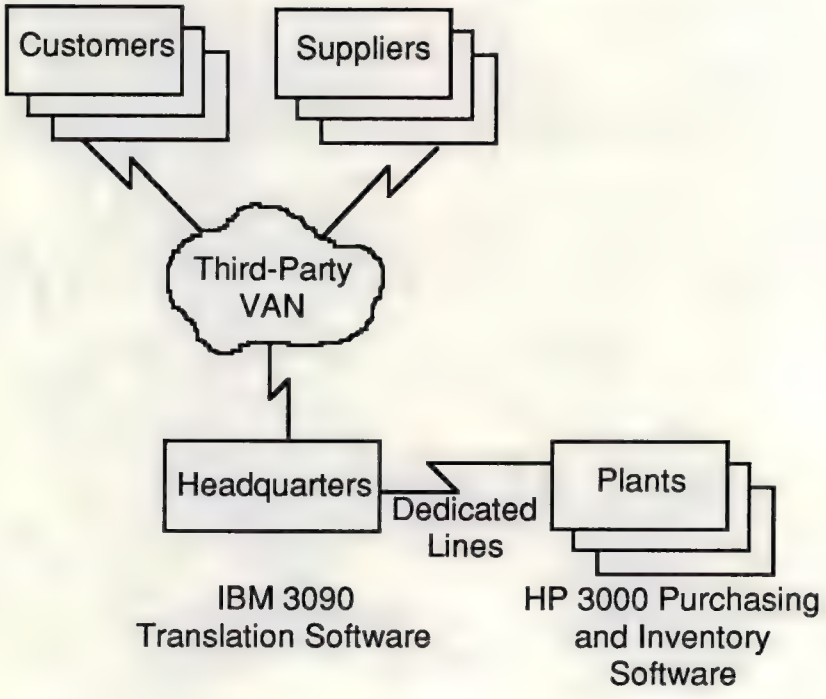
Hercules Incorporated



EDI USER PROFILE

GATES RUBBER CO.
Denver, CO
(303) 744-4835

EDI Contact: Rick Hall
EDI Project Manager

The Company

Gates is one of the largest manufacturers of automobile belts and hoses in the world. It sells and sources internationally and maintains many manufacturing plants in the U.S., Europe, South America, and Asia. Gates estimates that its revenues for 1990 will be $1.4 billion.

Functions and Formats

Gates uses X12 EDI and proprietary EDI with customers only. It is in the planning stages to conduct EDI with suppliers. It expects to begin sending X12 purchase orders and receiving invoices with one of its largest suppliers, Du Pont, later in 1990.

Gates uses two types of EDI: X12 and proprietary.

X12 is used with 20 of its largest OEM customers (which are automobile makers and industrial customers). The 20 customers are further broken out into approximately 400 ship-to locations.

Proprietary EDI is conducted with the thousands of customers in the automobile parts "after market." These are the parts supplies stores and distributors around the country. Gates uses Transnet and NapaNet to receive orders from these entities.

Gates uses the following X12 formats:

purchase order

material release 830

purchase order acknowledgement

invoice

advance ship notice

functional acknowledgement 997

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receipt advice 861

business acknowledgement 824

quality test data

Quantity of Data, Growth

Eighty percent of all purchase orders to Gates come electronically either by the proprietary or X12 standard modes.

Gates estimates that its X12 growth is around 10% over last year.

Settlements

Some of Gates' largest customers pay electronically using X12 payment/remittance advice format (820). Gates' bank handles the transaction entirely and sends month-end reports. None of the X12 data impacts Gates' accounting applications directly.

Cost-Benefit Impact

The main benefit of EDI to Gates is the elimination of the necessity of manually keying in orders. This is particularly important for those OEM customers who are requiring JIT deliveries and for the aftermarket customers, all of whom want delivery within three days to replenish store shelves.

Gates has not eliminated its customer service representatives. However, each representative can now handle more customers due to the efficiency of EDI. The number of Gates' customers is growing but its sales/customer rep staff has remained constant.

Gates also has an online order entry option for its customers. It is not EDI. It has eliminated order-entry personnel.

International, Japanese and Government Relationships

Gates is currently not doing EDI with overseas trading partners. Its plans first have it connecting electronically with its overseas plants. It may use EDI formats for this purpose. Then it will bring on international customers and suppliers.

Gates conducts EDI with the U.S.-based plant of Nissan. It does not conduct EDI with any other Japanese company or with a Nissan Japan-based location.

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Gates sells to the U.S. government (Department of Defense). It uses a proprietary format and a government network called "POPS." Gates' third-party VAN, Control Data, performs translation from this government format into another format readable by Gates' order-entry computers.

Implementation Phases

Gates initially implemented X12 EDI at the request of its largest OEM customers. Now it has a marketing group (with one full time dedicated person) that continually contacts customers and encourages/supports them to adopt EDI.

To start an EDI trading relationship, Gates and the company will first agree on what transaction sets will be used. Then they will send a test transmission. Gates will set its translation software to accept any custom parameter of the trading partner. If no new transaction set is used and no new application software at Gates is impacted, the test can take a single day.

Processing Sequences

The EDI purchase order is pulled off the network. It is translated then downloaded into Gates' distribution, order and manufacturing planning systems. Warehouse clerks read the order off of the distribution system and ship the goods. Logging the shipment on the system triggers an advanced ship notice to be sent.

Gates' order system eventually feeds the accounts receivable system that creates an invoice.

Protocols

Gates uses 3780 protocols. It has no plans to implement X.25/X.400.

Network Services

Gates uses two networks: GEIS (for Transnet, NapaNet -- the aftermarket customers) and CDC Redi*Net (for OEM and government customers).

The two networks are also interconnected which allows Gates to communicate with those OEM customers who are on GEIS. Gates conducts all of its OEM communications through CDC.

Configuration

See diagram.

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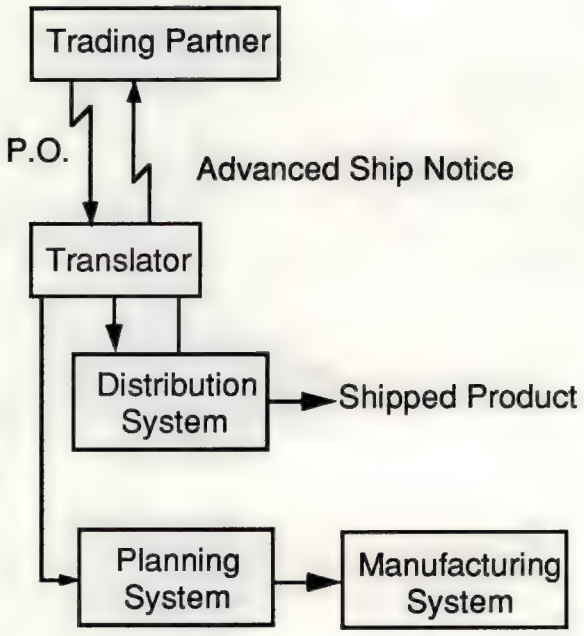
Gates Rubber Co.



EDI USER PROFILE

UNITED STATES MARINE CORPS
Payment Center
Albany, GA
(912) 439-5674

EDI Contact: Lt. Deborah Adams

The Company

The United States Marine Corps (USMC) Payment Center coordinates all the payments to commercial transportation carriers used by the 15 USMC bases in the country.

Functions and Formats

The Payment Center inaugurated an EDI program to pay carriers in 1988. It went online with one carrier, P.I.E. Nationwide, in December of 1989.

Two out of the 15 USMC bases use the payment center's EDI payment system. The percent of total bill paying that EDI accounts for is still "very small and limited in scope" according to Adams.

The transactions used are the TDCC Bill of Lading and the Freight Invoice. The USMC intends to migrate away from the TDCC formats and adopt the X12 equivalents, the 858 (bill of lading) and the 859 (freight bill).

Also used, is the X12 payment order/remittance advice (X12 820) used to pay the carriers. The payment services are conducted by Pittsburgh National Bank.

Cost-Benefit Impact

The primary benefit of EDI for the USMC is that it allows for speedy processing of freight bills/invoices.

In the paper mode, invoice processing (reconciling bill of lading with freight bill and then getting a certification for payment) required on average 14 days. With EDI, the process can take less than an hour.

Early in the eighties, the U.S. Congress passed legislation (the Prompt Payment Act) requiring all Federal offices to pay government vendors within specific time ranges.

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Without EDI, the USMC would be hard pressed to comply with the law.

The USMC has already taken two years to get the project this far.

International and Japan

USMC is not conducting EDI internationally at this time.

Implementation Phases and Problems

To entice trucking companies to inaugurate EDI, the USMC had to guarantee a certain amount of transportation business to them. PIE was the first company to take up the offer.

Other companies have yet to do so. The USMC wants to get other companies up and running, however.

The USMC Payment Office plans to implement in May, 1990, an overall transport payment system internally. All USMC bases will use TDCC (and eventually X12) formats to submit transport bills to the Payment Office, even if the carriers themselves are not using EDI.

Processing Sequences

A base will initiate an order for transport services by sending a bill of lading to the carrier. After the carrier has hauled the goods, it sends an electronic freight invoice.

Although the bill of lading and invoice pertain to a particular base, they are consolidated at the USMC Payment Office. The Payment Office pulls the documents from the BT Tymnet mailbox that each base uses.

The Payment Office matches the invoice with the bill of lading. With a match, it sends a payment instruction to its bank which then transfers funds via the ACH to the carrier's bank.

Protocols

Unknown

Network Services

The USMC project uses BT Tymnet and BT's Telink software.

Configuration

See diagram.

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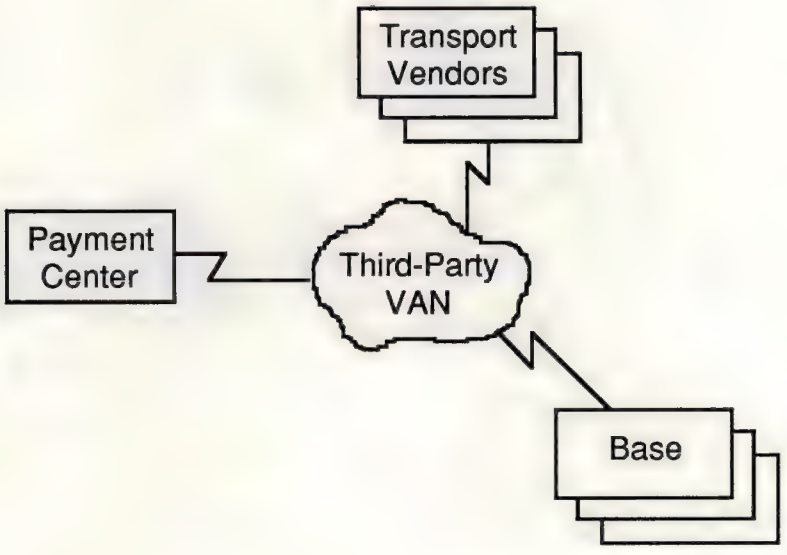
U.S. Marine Corps



EDI USER PROFILE

GENERAL SERVICES ADMINISTRATION
Federal Supply Bureau
Washington, D.C.
(703) 557-8500

EDI Contact: Robert Weeks

The Company

The General Services Administration, Federal Supply Bureau, is one of the Federal government's three principal procurement arms. In 1989, it purchased a total of $8.5 billion worth of merchandise -- everything from office supplies to automobiles -- for Federal government agencies throughout the world. (The Department of Defense and the Veterans Administration are the other two buying agencies in the Federal government.)

Functions and Message Formats

The GSA uses EDI with 24 of its vendors at this time. It just began exchanging electronic transaction sets in 1990. Altogether, the GSA deals with over 200,000 vendors. Of these, only 20,000 are active. And of these, only 1,000 are capable at this time of conducting EDI.

The GSA uses the X12 purchase order (850) and the purchase order change (860). It is working with trading partners to bring up the invoice (860), which it anticipates to become operational late 1990.

Trends and Growth

The GSA is currently sending approximately 4,500 to 7,500 EDI purchase orders per month. This represents 7 to 12 percent of its total purchase order volume.

The GSA is targetting its largest trading partners to do EDI with. Nevertheless, its EDI implementation is taking off slowly, according to Mr. Weeks.

Settlements

The GSA does not settle payments electronically at this time.

Cost/Benefit

GSA has just begun operations of its EDI program. It has no hard data on cost-benefit impact.

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International and Japanese Relationships

GSA purchases for government offices abroad. The central buying office in Washington D.C. receives requisitions from all points through a DoD operated network, Defense Automated Addressing System.

To date, however, the EDI purchases made by the GSA are on made on behalf of domestic Federal offices only.

GSA makes no EDI purchases from Japanese companies at this time.

Implementation Steps

GSA contacts its largest vendors and negotiates with them.

* Vendors are not enthusiastic to adopt EDI.

* Often, GSA will have disputes with the vendors about systems details.

* The sales personnel of vendors are suspicious of EDI and fear that they won't get credit for sales.

Processing Sequences

Requisitions come in from Federal locations over the Defense Automated Addressing System. The requisition is sorted according to the type of merchandise requested. The GSA is responsible for 70 categories (out of 280).

The requisition is forwarded to the proper GSA buyer. The system looks up in a contract file to identify the vendor and corresponding data (terms and conditions, price agreements, ship-to addresses, etc.).

After this, the system automatically creates a purchase order. If the vendor is EDI capable, the system sends the purchase order to the translator (and not the hard copy printer). After the translator, the EDI PO is launched onto the VAN (provided by GEIS).

Protocols Used

The system talks with the network using the 3780 protocol. It dials up the network and sends data at 4800 baud.

According to Mr. Weeks, when the EDI program gets up to higher volumes, GSA will probably switch over to using a dedicated line, with 9600 baud transmission speed, and an X.25 protocol.

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Network Services Used

GSA uses the network services of GE Information Services. It uses its interconnection services and monthly audit reports.

Configuration

See diagram.

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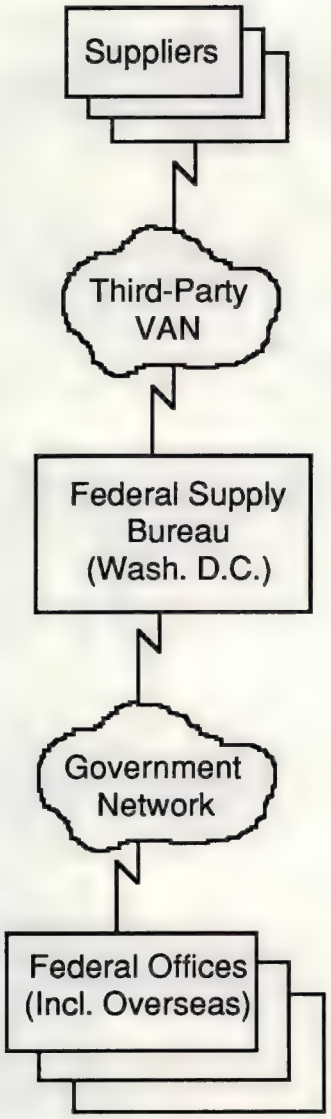
General Services Administration



EDI USER PROFILE

TRI WORLD TRAVELS
Dallas, Texas
(214) 241-4778

Edward Goodman
Proprietor
1989 Revenues: $4 million

The Company

Tri World Travels is a small, single shop travel agency in Dallas. It uses the Sabre reservation system offered by American Airlines.

Functions and Formats

Tri World uses the Sabre reservation system to book airline, hotel, and rental car reservations for many vendors in these categories.

The system is strictly a menu driven, online transaction processing environment.

Data formats are defined by the Sabre reservation system.

The system allows Tri World to make reservations, print itineraries, print tickets and boarding passes, and print confirmations of hotel and rental car reservations.

Quantity of Data, Trends

Agents at Tri World make approximately 75 to 100 transactions with the Sabre system per day.

Tri World stores 2,000 client records on Sabre. Records contain profile information on the client: sitting and meal preferences, work address, home address, credit card numbers and expiration dates, etc.

Settlements

No funds are transferred via the Sabre network. However, sales commissions are deducted from Sabre's monthly connect fee.

Cost-Benefit Impact

Tri World pays Sabre $600 per month to connect to the network. For each reservation made, it deducts $.50 from the monthly bill. Also, Tri World receives a commission from hotels and car rental agencies for bookings made.

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International, Japanese, and Government Relationships	Tri World's relationships in these areas are only its connection with an travel agency in Hungary. It makes bookings for them.
Implementation Phases	Tri World buys its terminals and pays Sabre for connection to the network.
Processing Sequences	Sabre requires 48 hours to confirm all reservations. Thus, agents will place reservations and set up an itinerary, then wait for two days for confirmation.
Protocol	Tri World connects with Sabre using dumb terminals and a 3780 protocol.
Network Services Used	Tri World has dedicated lines to Sabre's data center in Tulsa, OK.
Configuration	Tri World has four terminals as indicated in the following diagram.

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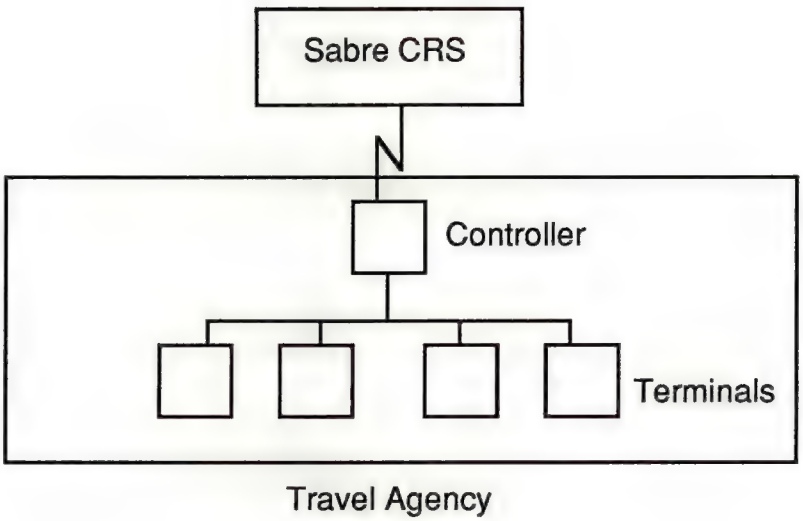
Tri World Travels



AMERICAN SOCIETY OF TRAVEL AGENTS
Alexandria, VA
(703) 739-2782

Stephanie Maxson
Managing Director, Automation

The Company

The American Society of Travel Agents (ASTA) is a non-profit trade organization with 22,000 member travel agencies which represent carriers, hotesl, resorts, sightseeing and car rental companies.

Functions and Formats

EDI is the transmission of standardized business documents from one computer to another. It typically occurs in a store-and-forward fashion.

Given this definition, travel agencies do not conduct EDI.

Computer reservation systems (CRS) are real-time transaction processing systems. Agencies use dumb terminals that are connected to the CRS over dedicated telecommunication lines.

The format of data is determined by the CRS database. Users interact with the CRS by keying commands and data.

Quantity of Data, Trends

Data on the total number of transactions on all CRSes was not available. The largest CRS, Sabre operated by American Airline, handles approximately 2 million transactions per day. Roughly 23,000 travel agencies subscribe to it.

The travel industry is considering the use of store-and-forward messaging for group and multi-faceted travel arrangement transactions.

Cruise lines and tours are two areas that are most likely to receive EDI systemization.

Both cruise line and tour arranging are typically done for groups of people rather than an individual person. Both entail an enormous amount of detail. In the case of cruise lines, port charges, cabin requirements, dinner seating and menu preferences, and other

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data must be compiled for each member of a group and submitted as a whole.

Tours involve arrangements across a wide variety of vendors (airlines, hotels, car rental agencies, bus tour operators, musuems, etc.).

Making cruise and tour arrangements is done a portion at a time and does not require a real-time processing environment.

Settlements

Credit card payments are used by travel agent customers to pay for agency services.

Also, CRS providers give chargebacks/discounts on their monthly bill for reservations (airline, hotel, car rental) made by the agent.

Cost-Benefit Impact

not applicable

International, Japanese, and Government Relationships

Computer Reservation Systems support reservations for major international airline companies.

Implementation Phases

A travel agency subscribes to an CRS service. It buys terminals from a hardware vendor.

Processing Sequences

The typical travel agent procedure is to receive a travel arrangement request from a customer.

The agent queries the CRS for availability of seats, cars, hotel rooms.

Eventually, reservation(s) are made. Two days must pass for a confirmation of the reservation and tickets. boarding passes, and itineraries are printed out.

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Protocol

Travel agencies are linked to CRSes with dumb terminals using a 3780 protocol. Large agencies with more than one office, may interconnect offices with a direct dial up. These kinds of interconnections also typically use the 3780 protocol but others are used as well. MNP, SNA, RJE are some of the more popular ones.

Configuration

The typical travel agency has three or four dumb terminals connected to the CRS with dedicated telecommunications lines.

Large agencies have more terminals or more offices. Sometimes offices systems interconnect to send administrative/accounting data back and forth.

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EDI USER PROFILE

YELLOW FREIGHT
Overland Park, Kansas
(913) 345-3253

Linda Melhorn
Manager, EDI and Marketing Systems
1989 revenues: $2 billion

The Company

Yellow Freight is one of the top three largest nationwide trucking companies in the U.S.

Functions and Formats

Yellow Freight does EDI primarily with its customers, shippers, and within the last six months has begun EDI with a few of its suppliers.

Its customer EDI consists of a proprietary online shipment status system as well as standard format EDI.

Standard format EDI with customers include the following transaction sets: bill of lading (TDCC 204), motor carrier invoice (210), shipment status (TDCC 214), remittance advice (ANSI X12 820), and the carrier tender (TDCC 602 -- used with the Department of Defense only).

Yellow Freight does EDI with its suppliers and uses the following transaction sets: rail invoice (TDCC 410), rail bill of lading (TDCC 404), and with non-transportation related suppliers, the invoice (ANSI X12).

Quantity of Data, Growth, Trends

The most widely used transaction set is the freight invoice/bill (210). Ten to twelve percent of all invoices sent from Yellow Freight to its customers are done via EDI.

Yellow Freight began its EDI program as a service to customers seven years ago. The company positioned EDI as one more differentiator of its transportation services.

In the last year, it has developed the ability to receive EDI bill of ladings. With this ability it now has a full EDI capability to exchange all documentation with the customer (bill of lading, shipment status, invoice).

With this milestone, Yellow Freight has turned away from

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characterizing EDI as a service feature and now looking at it as a competitive tool. It wants to leverage its use of it.

Settlements

Yellow Freight is receiving electronic payment from a handful of its largest customers. It uses the ANSI X12 820 transaction set for this.

Yellow Freight also receives remittance data from customers (via the 820) but receives the funds via a physical check delivered in the mail.

Cost-Benefit Impact

Yellow Freight initially implemented EDI as a customer service. It did not look at it in terms of cost-benefit.

Recently, it has looked upon EDI as a strategic technology. It has begun a cost-benefit study but would not reveal any findings.

International, Japanese and Government Relationships

No international nor Japanese relationships.

Yellow Freight is doing EDI with the Department of Defense.

Processing Sequences

A customer calls Yellow Freight to request transportation services.

The customer prepares a bill of lading.

When Yellow Freight's truck arrives, the customer gives the trucker a paper manifest which is a consolidated print out of the bill of lading.

The customer meanwhile transmits the bill of lading to Yellow Freight. The bill becomes the operative computer record for the entire transporation job.

If the shipper company is paying for the transportation services, Yellow Freight sends an EDI invoice the day after it receives the bill of lading. (If the receiving company pays for transport, Yellow Freight sends the invoice the day after the shipment arrives at the destination.)

The truck driver returns to the Yellow Freight terminal to

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yconsolidate the customer's shipment with other shipments bound for the same destination.

The bill of lading is updated with information concerning the shipment's new truck, departure, etc.

At each consolidation terminal or simply en route, the truck driver calls in the location of the shipment.

This information is attached to the bill of lading record. If the customer requests a shipment status update (using a TDCC 214 or Yellow Freight's proprietary system), it will receive the information called in by the truck driver.

When the shipment is delivered, the driver reports in. If the receiving company is responsible for payment, an invoice is sent.

Protocol

Yellow Freight uses the 3780 protocol with leased lines to two third party networks.

Network Services Used

Yellow Freight uses two third party networks, Transettlements and Kleinschmidt.

It uses interconnection services to reach customers on other networks.

It also uses audit reports (to track messages that are exchanged with other networks) and itemized monthly billing (which shows message traffic by trading partner).

Configuration

Yellow Freight's EDI software (purchased from TDCC and enhanced in-house) runs on an IBM 3090.

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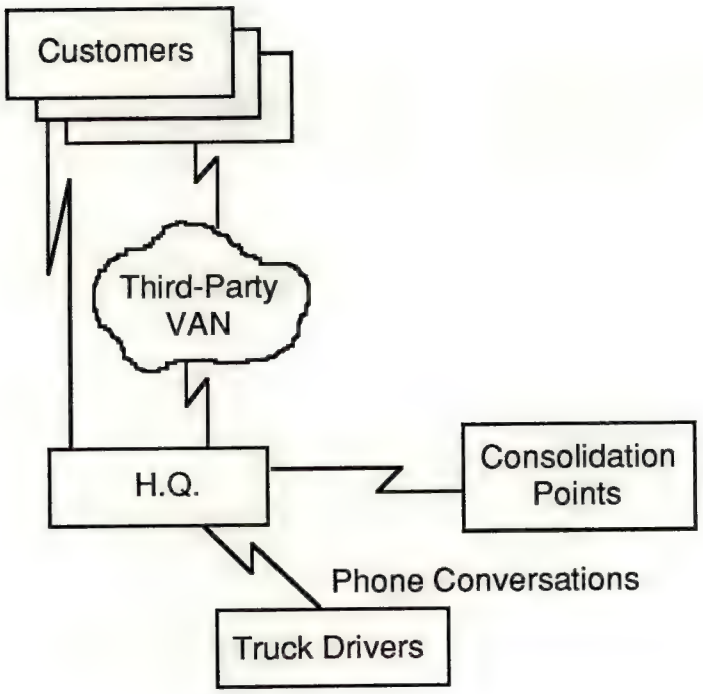
Yellow Freight



EDI USER PROFILE

AMERICAN PRESIDENT COMPANIES
Oakland, CA
(415) 272-7702

Gil Roeder
Manager, Corporate Communications
Revenue, 1989: $2.2 billion

The Company

American President Companies (APC) is a group of container distribution and transportation companies that provide deep sea shipping, trucking and railroad transportation services worldwide. APC's main service area is the Pacific. Transportation services between Japan and the U.S. is one of its largest markets.

Functions and Formats

APC has a variety of EDI systems all of which use proprietary formats except its program with U.S. Customs.

Eagle Data Access is APC's main customer EDI system. It allows customers to retrieve shipment status information. Customers use a PC to access APC's mainframe.

Import Information System allows importers to send purchase orders, receive ship advices, and exchange other import-shipment related data with APC's container consolidation subsidiary.

Automated Manifest System is APC's EDI connection with U.S. Customs. APC sends a vessel manifest to the Customs mainframe (in Virginia) prior to the arrival of a ship in a U.S. port. The exchange uses Customs-specified data formats.

EDI with third-party railroads. APC exchanges billing and loading information regarding the movement of containers via railroads.

EDI with select, large customers. APC is developing EDI linkages with a handful of its largest customers on a case-by-case basis. A couple of these customers are Japanese automobile manufacturers.

Eagle Link is not an EDI system but related. Customers with push-button telephones can receive shipment status reports by phone. Customers type in their bill of lading number and an automated voice response system reads out information from APCs database.

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Trends and Growth

APC would not disclose the volume of EDI messages it carried.

APC has less than 100 mainframe-to-mainframe EDI customers. It has between 500 and 1000 EDI customers who access the APC mainframe via PCs.

APC launched its EDI systems in the mid-1980s with high expectations and an aggressive advertising campaign. Althoug, today APC has approximately 1,000 customers who use EDI to retrieve shipment status information, the EDI program has not grown as fast as expected.

Consequently, APC has changed its EDI strategy. It is building EDI services on an ad hoc basis for large, select customers who request them.

Settlements

Interviewee was unaware of APC using EFT to pay suppliers or receive payment from customers.

Cost-Benefit Impact

APC implemented EDI as a service to customers and to differentiate themselves from competitors. The single benefit, therefore, has been to give them a competitive advantage. APC will not disclose any report concerning how EDI has impacted operational costs and efficiencies.

International, Japanese and Government Relationships

Most of APC's EDI customers are domestic American importers. However, a few large Japanese companies do EDI with APC. (APC would not reveal names.)

APC conducts EDI with U.S. Customs via the Automated Manifest System. And, it had won a contract with the U.S. Military for deep sea shipping services

Implementation Phases and Problems

APC implemented its EDI shipment status service, Eagle Data Access, in 1985. In 1988 it launched Eagle Link, the telephone data access. The Automated Manifest System began also around the 1987 timeframe.

As stated above, the only problem (disclosed in interview) is the fact that EDI is not being used by customers as much as APC had expected.

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Processing Sequences

APC records all ship movements, customer shipments, and other shipping related data on a central relational database. Information is put into the database via APC's 200 worldwide office locations. Customers access this database via EDI and the telephone voice synthesis system.

Protocols

APC operates its own corporate network. It is based on IBM's SNA architecture and SNA protocols. Customers, however, may dial into APC directly using a variety of protocols. APC has a protocol converter front end computer (a DEC VAX). The front end also communicates with third party VANs using a variety of protocols.

Configuration

APC has two data centers (located in California). They run IBM 3090 and Amdahl mainframe computers with MVS-XA operating system. Approximately 200 APC offices in the U.S., Asia and Europe are tied into the data centers via satellite, private and public telecommunications lines and microwave circuits. APC operates switching devices and concentrators at various locations of its network.

At the data centers, APC has a front-end DEC VAX that operates as a Universal Communications Processor, handling data communications traffic and protocol conversion with direct dial-up connections and VAN connections.

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246

EDI USER PROFILE

MEMORIAL SLOAN KETTERING HOSPITAL
New York, New York
(212) 639-3308

John McBride
Director of Patient Accounts
1989 revenues: $370 million

The Company

Memorial Sloan is a 565 bed hospital that specializes in cancer and cancer-related illnesses.

Functions and Formats

Memorial Sloan uses EDI to submit insurance claims to insurance carriers.

It submits claims to Medicaire, Blue Cross of New York, Medicaid, NEIC, and Blue Cross of New Jersey.

It submits claims either via telecommunications or courier-delivered magnetic tapes.

Electronic claims generally adhere to the government-specified UB-82 format. Each claim recipient, however, has its own special requirements causing modifications to the UB-82 format.

Sloan Memorial has just begun to look at using EDI to purchase pharmaceutical and medical/surgical supplies.

Quantity of Data, Growth, Trends

Sloan Memorial sends approximately 90-92% of its insurance claims electronically.

It began its electronic-claims submission program in 1985 when it installed its Shared Medical System software.

At that time, Sloan was submitting only 10% of its claims electronically (on tape).

Settlements

Sloan is not receiving (nor paying) electronic payments. It has no plans for payments in 1990.

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Cost-Benefit Impact

Electronic claims submission has improved cash flow at the hospital. The national average for the time between when a hospital discharges a patient and when it collects insurance payment is 70 days. At Sloan it is 40 days.

Also, because manual data entry is eliminated, the rejection rate of claims with incorrect data in them is almost nothing.

Sloan has been able to reduce its total labor cost in the accounts billing department by 22%.

International, Japan, and Government Relationships

Sloan performs the claims submission with Medical, Medicaid, and Blue Cross which are government or, in the case of Blue Cross, quasi-government agencies.

It does not conduct EDI with international or Japanese organizations.

Implementation Phases and Problems

Management at the hospital believed in systems. The information systems/accounting personnel looked at banks, insurance companies, and other large systems before they made their decisions.

The government agencies were already able to receive claims electronically. This made it easier for Sloan to adopt EDI.

Processing Sequences

All claims related processing is based on a central patient database. All transactions related to a patient (admission, examination, treatment, laboratory work, patient management, meals, utilization review, and billing) are recorded on a central file.

Claims submission is initiated when a patient is discharged.

Claims are sorted according to insurance carrier. All claims of a particular carrier are placed in a single file and a tape or a telecommunications transmission is made.

Protocol

Transmission protocols are generally 3780.

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Network Services Used

Sloan does not use a VAN. For those claims sent via telecommunications, Sloan dials directly to the processing computer.

Configuration

Sloan runs Shared Medical System software that runs on a IBM 3090 mainframe.

1,200 devices including terminals, personal computers, printers, patient card embossers are attached to the mainframe.

Within the patient account billing department, 110 terminals are attached to the mainframe, some of which are responsible for preparing claims submissions.

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250

UNIVERSITY OF TEXAS, AUSTIN
Austin, TX
(512) 471-0281

EDI Contact: David Stones
Database Coordinator, Student Affairs

The Company

The University of Texas, Austin, is one campus of a statewide university. Total student body at the Austin campus numbers 50,000

Functions and Formats

The university exchanges transcripts over a third-party network in proprietary format with 17 other colleges and universities in Texas.

The university has just begun an experimental EDI operation to exchange student transcripts with two colleges in Florida. The institutions have designed a data format based on the X12 architecture. They have submitted the design to the X12 standards committee for official approval.

The university also conducts proprietary (non-standard) EDI with a number of different organizations. These include the following:

- Veterans Administration: the university sends on magnetic tape records on students who are receiving VA tuition benefits.

- Guaranteed Student Loan processing agencies: via magnetic tape exchanges, the university and these agencies report on students who have received government educational loans.

- student financial aid information: agencies that process student applications for financial aid transmit this data (via telecommunications) to the university.

- test scores: the university receives the results of standardized tests taken by students from independent testing agencies.

Quantity of Data, Trends

Specific quantities were not known by interviewee and would have been difficult to collect. Nevertheless, he offered these points:

The university processes 50,000 university transcripts and 20,000

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incoming freshman transcripts (from high schools) per year.

Settlements

The university is not using EFT.

Cost-Benefit Impact

No cost-benefit study has been performed, however, the following benefits were noted.

The basic benefit of EDI in exchanging student records (transcripts, financial aid, or whatever) is the elimination of manually inputting the given data into electronic databases.

Elimination of hand keying of data is critical in the university's case because much of the data requires processing within certain time frames. Student transcripts and test scores are produced after a certain date (end of a semester) yet must be submitted to an admissions office by a certain deadline.

EDI helps manage the process of processing student records. EDI transmissions can quickly indicate what components of a student's application are missing (transcripts, test scores, financial aid information, etc.).

Electronic transcripts facilitates the evaluation of student applicants. In some cases, transcripts are automatically scored for curriculum equivalencies between the universities courses and courses the applicant had taken at other institutions.

International, Japanese, and Government Relationships

The university is not yet conducting EDI with institutions outside of the U.S. Along with other American universities, it plans to develop an international data format (based on the EDIFACT standard) to exchange student transcripts.

As mentioned above, the university is exchanging information with the Veterans Administration and test agencies. Also, it is working with the Department of Education to develop formats for the exchange of transcripts and to develop other electronic network services.

Implementation Phases

Adoption of EDI at the university has been piecemeal and not done according to a master plan. Each department or campus office has adopted EDI on its own and in accordance with the professional practices of that office's jurisdiction (test scores, financial aid, Veteran's Administration, etc.).

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The development of an X12 standard for the exchange of transcripts has required the group effort of many universities and educational agencies.

The U.S. Department of Education has financed the meetings of the group making the X12 standard and the American Association of Collegiate Registrars and Admissions Officers administers the group's work.

After the test between the University of Texas, and the two colleges in Florida, the group wants to bring more institutions into the fold.

Processing Sequences

(The contact was knowledgeable about transcripts only.)

The university processes student applications in two stages. First, it evaluates if the student has submitted all the necessary materials: transcripts, test scores, application, essays, etc.

Second, once all the materials are in, the university admissions officers evaluate the student applicant.

EDI is helpful in the first process because it eliminates manually entering the data from transcripts. It helps in telling admissions officers if the materials from the student are complete or not.

Protocol

The transcript transmissions are the only EDI at the university that move over a third-party network.

The university uses a PC as a conduit between the university's mainframe and the network.

The PC uses the XModem protocol to connect to the network.

Network Services Used

The university uses the GEIS network to send transcripts.

GEIS has created a virtual private network for the universities exchanging transcripts in Texas. It is called the Texas Electronic Transcript Network and is administered by the Association for Higher Education for North Texas.

Other than relying on the security measures of the network and receiving billing statements at the end of the month, university

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does not use any special services available from GEIS.

Configuration

The university's computing facilities are divided into two departments: academic computing and administrative computing. EDI functions at the university are processed on the administrative computing facilities.

Administrative computing uses a mainframe computer. The mainframe does not connect to the network that is used for sending/receiving transcripts. This latter function is provided by a single PC in the registrar's office.

Other EDI at the university is largely conducted via the exchange of magnetic tape except in the case of financial aid information which comes in via direct connect to the mainframe.

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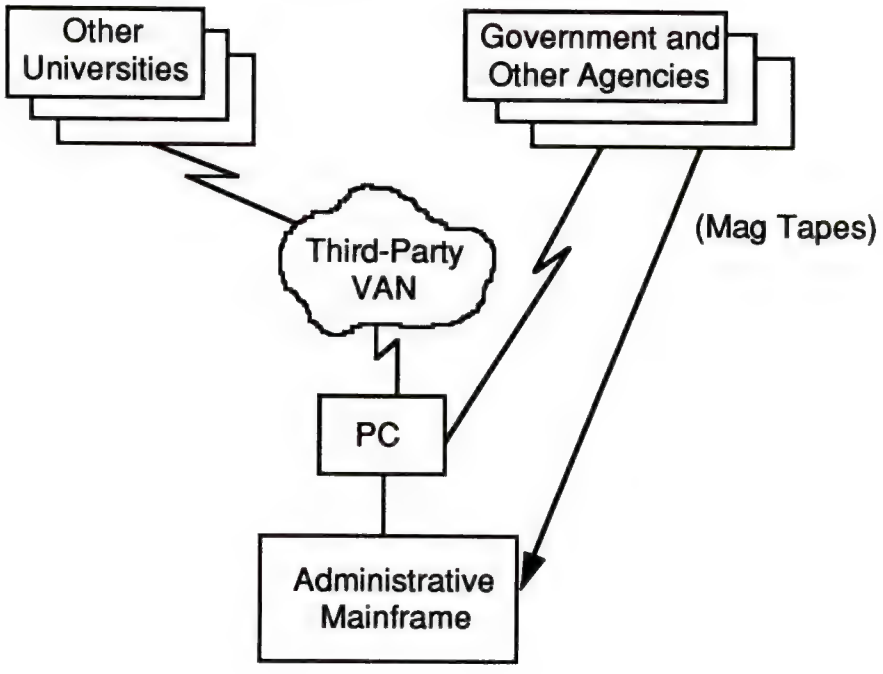
University of Texas, Austin



EDI USER PROFILE

PACIFIC GAS AND ELECTRIC
San Francisco, CA
(415) 973-3464

EDI Contact: Mary Hurley,
Senior Buyer, EDI Project Manager

The Company

PG&E is the power utility of Northern California supplying residents from roughly Santa Barbara to the Oregon border with natural gas and electricity.

Functions and Formats

PG&E uses EDI with suppliers only. Currently, 23 can receive X12 purchase orders (the 850 transaction set).

Trends and Growth

In a few months, PG&E will implement PO change order and acknowledgement. By the end of 1990, it plans to implement invoices and possibly, electronic payment.

PG&E just started its EDI program in the Fall of 1989. It is bringing up trading partners at the rate of one every one and a half weeks.

It is going after the largest suppliers first.

Today they are sending out 40 POs per day, or eight percent of its total PO volume.

200 of PG&E's top volume suppliers represent 65% of all PG&E's PO volume. Altogether, PG&E purchases from approximately 6,000 suppliers.

Settlements

No electronic payments at this time. Possibly by the end of the year.

Cost-Benefit Impact

- getting POs much faster to suppliers (24 hours instead of sometimes up to 2 weeks)

- better working relationships with suppliers

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- makes existing staff more efficient; staff takes care of exceptions

- there has been no reduction in the buying staff (30-40 buyers, centrally located).

- when the EDI invoices become operational, PG&E expects to lay off lots of clerks in its accounting department.

International and Japanese Relationships

It does not do EDI internationally, with a Japanese company, nor with the U.S. government.

Implementation Phases

PG&E surveyed its suppliers to find out which ones could conduct EDI and what VAN they used. (slightly less than 10% could do EDI.) They then targetted the ones that they could do EDI with easily.

PG&E chose those companies with the largest PO volumes and that could do EDI. A PG&E buyer contacted the company and asked to do EDI. With approval, a PG&E technical person contacted the supplier's technical personnel. They would do a test transmission. Usually, it only takes a week to get a capability to send POs. (These are with suppliers who already have EDI software etc.)

Eventually, PG&E will go after companies that are not EDI ready. It will sponsor seminars to educate them about EDI.

Processing Sequences

PG&E buyers are located throughout PG&E's service area. Through a distributed Material Acquisition System, they place purchase requisitions.

The Material Acquisition System checks to see if a vendor is EDI capable. If it is, it sends the requisition to the EDI translator. The translator converts the requisition to an X12 purchase order and sends it over the network.

The Material Acquisition System transmits PO information to PG&E's accounting system.

Protocols

Unknown

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Network Services

PG&E uses Control Data's Redi*Net EDI VAN. It uses the VAN's interconnect service to reach trading partners on other VANs. Also, it uses audit trail reports provided by the VAN. These tell PG&E whether a PO was received by a trading partner, what time it was received, etc.

Configuration

See diagram.

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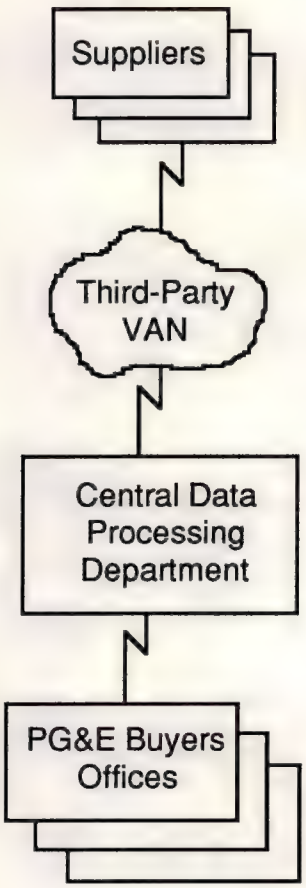
Pacific Gas and Electric



INPUT

EDI USER PROFILE

SOUTHERN CALIFORNIA EDISON
Los Angeles, CA
(818) 302-5347

EDI Contact: Robert Dempsey
EDI Coordinator

The Company

Southern California Edison is the power utility serving the greater Los Angeles and Southern California area. It is in the midst of a merger with San Diego Gas & Electric.

Functions and Formats

Southern Californis Edison uses EDI to purchase office supplies and material equipment (replacement parts for its power delivery infrastructure).

It uses the X12 purchase order (850) and the functional acknowledgement (997).

Growth, Quantity of Data, Trends

Southern California Edison conducts EDI with 90 suppliers. Some of these suppliers are distributors/agents so that the total number of suppliers reachable through EDI is 190.

EDI accounts for approximately 22% of all material ordered by Southern California Edison. This does not count services ordered by Southern California Edison (which will most likely never use EDI, according to Dempsey).

Currently, EDI is used for release type purchase orders. Releases are contract purchase orders where prices, terms and conditions are negotiated usually annually. Throughout the contracted period, release purchase orders are sent referencing the blanket purchase order.

EDI accounts for roughly 65% of Southern California Edison's release purchase orders.

It has taken Southern California Edison 18 months to bring up 90 trading partners (or 22% of its material purchasing volume).

Southern California Edison is in the process of acquiring a large power utility, San Diego Gas & Electric. Its EDI program has

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slowed down as a result. Only two part time programmers are assigned to the project.

Southern California Edison plans to adopt more transaction sets in the next 12 months. Specifically, the purchase order acknowledgement (853), the invoice (810), and the advanced ship notice (856).

Settlements

Southern California Edison does not pay suppliers electronically and has no plans to do so in the next 12 to 24 months.

Cost/Benefit Impact

Southern California Edison has not quantified any cost-benefit impact.

It has reduced the lead time in orders for those materials that can be ordered via EDI by seven days.

Its ultimate goal for adopting EDI is to reduce the cost of carrying inventory.

International, Japanese and Government Relationships

Southern California Edison does not conduct EDI with international trading partners including Japan. However, through distributors, it buys Japanese equipment.

Implementation Phases and Problems

Southern California Edison targets its largest suppliers (in terms of purchase order volume; not dollar volume) to do EDI with.

It uses the VAN services of Harbinger Computer Services to sponsor educational seminars for its trading partners.

It has put on three seminars in the last 18 months.

It also individually calls trading partners, distributes guidelines, and generally tries to publicize (through trade show attendance) that it is willing to conduct EDI with suppliers.

Processing Sequences

Currently, all POs of Southern California Edison are release purchase orders. They are for stock-room replenishment materials. Consequently, purchase orders are generated entirely automatically.

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Southern California Edison's Material Management System keeps track of inventory. When the stock level of a certain item goes below the order point, the system checks to see if the item is a blanket purchase order item. If it is, it automatically creates a release (purchase order). The system then checks to see if the vendor is capable of receiving the purchase order electronically, if it is, then it sends the system PO to the translator. From the translator, it is sent out over the network, eventually reaching the trading partner.

Protocol

Southern California Edison uses IBM's SNA protocol.

Southern California Edison uses TranSettlement's (now TSI International) translation software. It uses an SNA protocol.

Network Services Used

Southern California Edison uses Harbinger Computer Services as its VAN.

It uses interconnection services with other VANs. It uses the service of Harbinger keeping records of messages so that they can be resent to trading partners if needed. This is used "quite a bit," according to Dempsey, especially for trading partners who are reached through interconnects. Messages are lost during interconnect.

Configuration

Southern California Edison runs an EDI translation package on an IBM mainframe.

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EDI USER PROFILE

LINCOLN NATIONAL CORPORATION
Fort Wayne, IN
(219) 427-2000

EDI Contact: Beverly Stein
Assistant Vice President, Treasurer's Department
Total 1989 Revenue: $7 billion

The Company

Lincoln National Corporation (LNC) is the nation's seventh largest insurance holding company, with assets of nearly $23 billion. Through its subsidiearies, it markets individual life and health insurance, reinsurance, employee benefits, corporate pensions, annuities, property-casualty insurance and investment-related services.

EDI Functions and Formats

LNC uses electronic funds transfer mechanisms for a variety of payment and collection applications.

Primarily, it uses EFT for paying its employees, corporate mortgage payments, and, in two states (Indiana and Idaho), its employees' state witholding taxes.

It also uses EFT for rent payments, annuities, retirement benefits, dividend funding, and intra-company account funding.

So far, all applications of EFT are accounts payable and utilize the ACH's direct deposit mechanism.

All of LNC's EFT payments are made using Automated Clearinghouse (ACH) formats. No other EFT nor EDI formats are used at this time.

Trends, Organization, Growth, and Quantity of Data

LNC does not invoice customers. It is not yet paying out healthcare payments to healthcare providers. The latter, however, is a targetted objective. It wants to use EDI along with EFT payments because typically a great deal of paperwork accompanies payments to healthcare providers.

Thirty-three percent of all payments by LNC are made electronically.

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Settlements

(see above)

Cost/Benefit Impact

LNC estimates that through reduced costs in paper and postage, EFT saves the company $95,000 annually.

LNC saves between $.40 and $1.99 each time it issues an electronic payment instead of a paper check.

International and Japan

LNC does not conduct EFT outside the United States.

Implementation Phases and Problems

Using EFT at LNC has been primarily a marketing exercise. LNC has had to convince recipients of payments to receive them electronically.

Older people entitled to LNC annuities and pensions have been relatively skeptical of non-check payment systems. However, marketing by LNC has converted many of these people.

LNC's employment policy mandates that all employees receive payroll payments electronically.

Processing Sequences

Payments are automated. For example, a pension payment is initiated in a database file. The record for a given retiree becomes active on a particular monthly date. This record is held until the corresponding bank dials into Lincoln's computer to retrieve it.

Protocol

Unknown.

Network Services Used

Unknown.

Configuration

See diagram.

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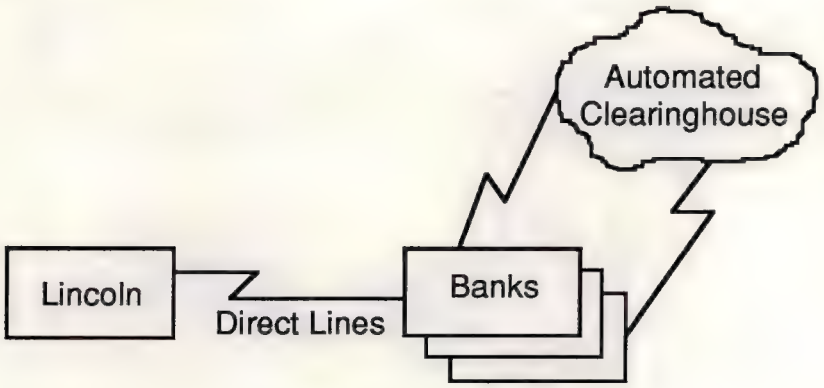
Lincoln National Corporation



EDI USER PROFILE

THE AETNA CASUALTY AND SURETY COMPANY
Hartford, CT
(203) 273-6739

EDI Contact: Barbara Reilly
Communications Technology Planner

The Company

Aetna is one of the largest, full-line insurance companies in the United States. Revenues for 1989 were approximately $20 billion.

Functions and Formats

Aetna uses EDI in two applications: purchasing and claims processing.

The use of EDI in purchasing was initiated in 1988. The X12 purchase order (850) and purchase order change (860) are the two transactions in use.

In the claims processing area, Aetna uses a clearinghouse called National Electronic Information Corporation (NEIC) to gather claims from hospitals and health-care providers.

NEIC places terminals at provider premises.

NEIC processes claims for 10 other insurance companies besides Aetna.

NEIC gathers claims from providers and passes those for payment by Aetna onto Aetna.

The format used for these claims is the Uniform Bill 82 (UB 82), a format specified by HCFA, an agency within the U.S. Department of Health, Education and Welfare.

Growth and Quantity of Data

In the purchasing EDI application, Aetna sends approximately 20% of its purchase orders via EDI. This involves four to five trading partners.

By December of 1990, Aetna expects to double the volume of P.O.s sent via EDI.

Aetna is planning to implement a system that accepts invoices

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from suppliers. It will use the X12 810.

Use of NEIC for claims processing began in the early eighties. Aetna declined to say exactly what percentage of its claims are processed this way.

The volume of claims by all members of NEIC, however, has been rising, according to representatives at NEIC.

Organization and Trends

Aetna representatives are actively involved in both the X12 and EDIFACT standards groups.

They are working on insurance enrollment/eligibility transaction sets in the X12 standards family. These transaction sets allow companies to enroll employees into insurance plans.

In EDIFACT, they are working on reinsurance message formats. These formats transfer data between brokers and reinsurers.

According to Aetna representatives, the EDIFACT formats should become especially popular in the European insurance markets including markets where U.S. and European insurance carriers reinsure each other.

Aetna expects to use the EDIFACT formats for reinsurance by second quarter 1991.

Settlements

Not known by interviewee.

Cost-Benefit Impact

No quantifiable cost-benefit impact.

International and Japanese Relationships

No EDI connections outside the U.S. As mentioned above, Aetna expects to use the EDIFACT reinsurance formats (which are not yet status one -- draft status for trial use) when they become available. It will use them primarily with European carriers especially through the RINET network.

Implementation Phases and Problems

For its EDI with suppliers, Aetna has pursued those suppliers that account for its largest purchase order traffic (office supplies, computer supplies, furniture).

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For the claims processing, Aetna has left the marketing of the processing services to NEIC. NEIC installs terminals at healthcare provider sites. It encourages the use of electronic transmission of data.

Processing Sequences

With suppliers, Aetna's EDI program is located within its centralized purchasing department. Its purchasing system is interfaced with a translation software package. The translator places flat files from the purchasing system into X12 formats. With a modem and communications software, the formats are sent to a third-party network then on to the trading partner.

For the processing of claims, Aetna first downloads claims gathered by NEIC. These claims are then fed into Aetna's processing application.

Protocol

SNA

Network Services Used

Aetna uses the IBM Information Network.

Configuration

Unknown by interviewee.

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EDI USER PROFILE

PACIFIC BELL
San Lorenzo, CA
(415) 823-0541

EDI Contact: Mary Olivas, Ray Wetteland,
Procurement Managers

The Company

Pacific Bell is the regulated arm of one of America's seven Regional Bell Holding Companies providing local exchange carrier services for the Pacific coastal states.

Functions and Formats

EDI is used by Pacific Bell with its suppliers. Customer EDI is not a reality yet.

Pacific Bell uses EDI to buy both capital equipment (telephone cable, repair parts, switching station equipment, etc.) as well as administrative supplies (office supplies, stationery, etc.).

Currently, 102 vendors can receive EDI purchase orders from Pacific Bell. Only 48 can send invoices.

Pacific Bell uses the following X12 transaction sets: purchase order (850), purchase order acknowledgement (855), purchase order change (860), invoice (810).

Trends, Growth, Quantity of Data

In 1990, it plans to implement the advance ship notice (856) and the payment order/remittance advice (820).

Pacific Bell expects to bring on 75 more vendors by December, 1990 (representing 75% increase). It will begin the two new transaction sets mentioned above as well.

Currently, Pacific Bell sends 60% of its purchase orders to vendors via EDI. Seventy five percent of its invoices come via EDI.

In 1989, Pacific Bell sent 97,000 purchase orders. It received 120,000 invoices.

Settlements

No electronic payment is done currently. However, Pacific Bell plans to inaugurate a pilot program in late 1990.

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Cost-Benefit Impact

The biggest benefit of EDI has been the reduction of supply inventories. Specific quantities were not available.

International and Japanese Relationships

Pacific Bell does not conduct EDI internationally.

It does conduct EDI with U.S.-based Japanese companies such as NEC America.

Implementation Procedures

Pacific Bell targeted its largest suppliers (the ones providing the bulk of its supplies) for EDI. Also, targetted minority businesses to fulfill government regulations.

Pacific Bell sponsored eight seminars for its suppliers educating them about EDI. It publishes and distributes an EDI implementation guidelines to its suppliers. It does not recommend software or network services.

Processing Sequences

EDI is linked to Pacific Bell's corporate purchasing application called NOVA. NOVA is accessible from terminals throughout Pacific Bell's offices. Users are not necessarily purchasing agents. Pacific Bell employees who have a responsibility to make sure certain supplies are maintained are given authorization to use NOVA. NOVA provides users with a catalog of items. Users specify what they want to purchase, quantity, and NOVA prepares the purchase order.

Protocols

Unknown.

Network Services

It uses a single network (BT Tymnet) that is interconnected with seven other VANs.

Configuration

See diagram.

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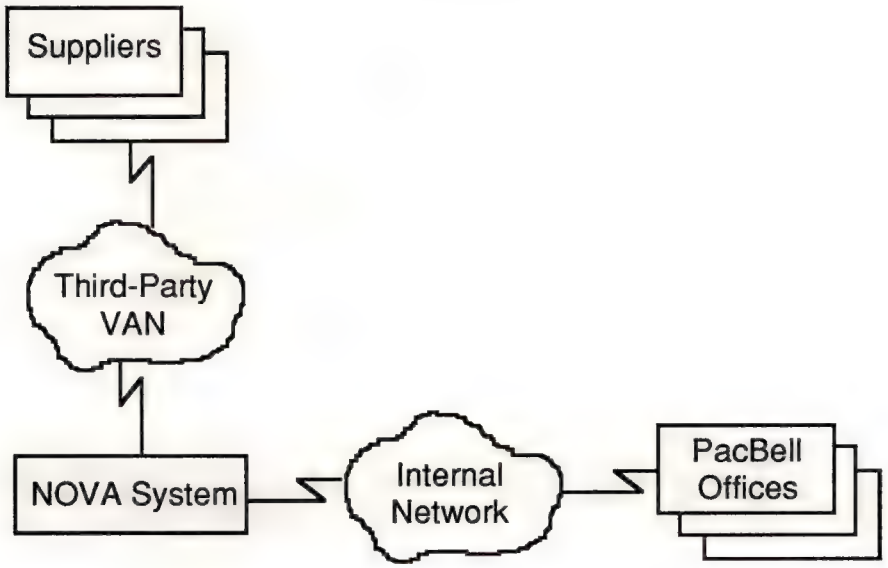
Pacific Bell



EDI USER PROFILE

U.S. WEST
Testing the address
P.O. Box 23579
Portland, OR 97223
(303) 930-6921

William Ricker, Product Manager, EDI Services, U.S. West Business Resources

The Company

U.S. West is one the seven Regional Bell Holding Companies in the United States.

Functions and Formats

EDI at U.S. West is taking place in a subsidiary company that handles all procurement for U.S. West, U.S. West Business Resources.

U.S. West has just begun using EDI. It is testing transmissions with six suppliers.

It is receiving invoices from these suppliers. From one U.S. West subsidiary, it is receiving purchase orders.

The suppliers sending invoices were formerly units of American Telephone and Telegraph and therefore sister operating divisions to U.S. West.

The invoice format is one developed by BellCore (the research and development company that is shared by all RBOCs) that was used among operating units of American Telephone and Telegraph before the company was divested.

The purchase order that U.S West receives is the X12 850 format.

Growth, Trends, Quantity of Data

U.S. West plans to convert all data formats over to the ANSI X12 family.

It is in the test phase now with six suppliers and one U.S. West subsidiary, but by the second or third quarter, 1990, it expects to make these links fully operational.

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U.S West would not divulge the proportion of transactional data that its EDI trading partners represent, but said that even in an operational stage it will be negligible.

Settlements

No EFT is conducted.

Cost-Benefit Impact

U.S. West would not divulge data it had gathered in a preliminary cost-benefit study.

International, Japanese, and Government Relationships

U.S. West is not conducting EDI with overseas or U.S. government bodies.

Implementation Phases and Problems

U.S. West revealed little of its implementation of EDI.

U.S. West developed all software for its EDI program including translation software.

Protocol

Protocol used to connect to the third-party VAN is a 3780.

Network Services Used

U.S. West would only say that it uses a third-party network, nothing more.

Configuration

U.S. West runs its procurement and EDI programs on an IBM mainframe. (This is all that they would say.)

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EDI USER PROFILE

THE HARPER GROUP
San Francisco, CA
(415) 978-0762

EDI Contact: Dennis Reed
Manager, MIS

The Company

The Harper Group is an international freight forwarder and customs broker.

Functions and Formats

Harper uses the following transaction sets:

- the X12 810 invoice (exporters send this to Harper to enable Harper to prepare export documentation; the invoice also has to travel with the freight; it is not used by Harper to bill customers)
- the X12 856 Advance Shipment Notice (Harper sends it out to customers)
- the TDCC 304 shipment information/freight invoice (Harper uses this to bill customers)
- the TDCC 110 air shipment update freight notice
- Harper also does EDI in proprietary formats with some customers

Harper has been approached by a few large customers to implement EDIFACT messages particularly the Cusdec (Customs Declaration) and the IFTM (International Freight and Transport Message).

Organizations, Trends, Growth, Quantity of Data

Harper conducts EDI (proprietary and standard) with less than 10 trading partners.

Its daily EDI volumes range from 65 to 100 EDI messages per day.

Half of the data flow is in proprietary formats.

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Its EDI program is two years old. It is bringing on new EDI trading partners at a rate of two to three per year.

According to Reed, the program is going "very slow, we haven't pushed it."

Settlements

Harper is not conducting any kind of electronic payment system (either accounts payable or receivable).

Cost-Benefit Impact

Primarily EDI has kept customers satisfied. (Customers have requested that Harper do EDI.)

Using the electronic invoice has sped up funds collection.

Also, with electronic updating on shipment status, Harper customer service staff is not so busy on the telephones as they once were.

International, Japanese, and Government Relatinships

Harper is an international company. So are many of its customers.

So far, all EDI customers are domestic.

It is not doing EDI with any Japanese nor government organizations.

Harper has been approached by Japanese electronics and auto companies that it already does business with. These companies had originally proposed exchanging electronic data in proprietary formats.

Implementation

Harper has implemented EDI at the request of customers.

They first did EDI in proprietary modes. Then in 1988 they implemented X12. Now they are considering EDIFACT. Upper management at Harper is grumbling that no single standard has matured. Upper management reluctance has caused the program not to grow as much as it could.

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Processing Sequences

Not divulged.

Protocol

Harper's shop is an IBM one. (3081)

It uses the SNA protocol and the SDLC protocol.

Internal to the firm it uses the International Air Transport Association network, SITA, for international communications. And the Sears Communications Company network for domestic networking.

With trading partners, it uses the networks of GEIS, Control Data, BT Tymnet, IBM Information Network, and the U.S. military DASSO network.

Configuration

See diagram.

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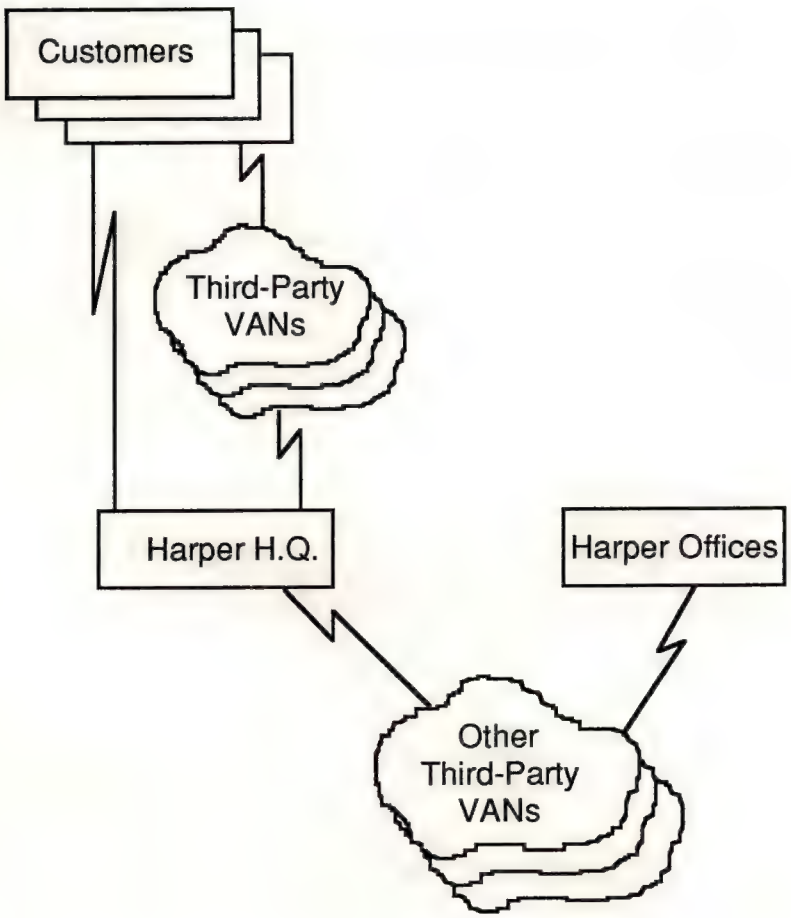
The Harper Group



EDI USER PROFILE

THE FRITZ COMPANIES
San Francisco, CA
(415) 541-8550

EDI Contact: Chris Aldrich, Manager of User Liaison, MIS
Private Corporation

The Company

The Fritz Companies are a group of companies that provide customs brokerage, freight forwarding, logistics support, consolidation, warehousing, and insurance services to customers throughout the world.

Formats and Functions

Fritz conducts EDI with approximately six to 12 of its customers, one agent, and United States Customs.

Transaction sets used are:

- TDCC 304, Ocean Shipment Information: Fritz receives this from exporters,
- TDCC 110, air manifest: Fritz receives this from a large air courier for import brokerage,
- ANSI 810, invoice: Fritz receives this from its agent in Japan and it sends it to importer customers,
- ANSI 856 advance ship notice: Fritz receives this from exporters and sends it to importers
- ABI, Automated Broker Interface: Fritz uses this with U.S. Customs to send in import declarations and to receive clearances.

Fritz is starting a pilot with the EDIFACT IFTM message set.

It is also considering implementing the TDCC 301 (shipment booking on an ocean carrier), TDCC 310 (booking confirmation), and the ANSI X12 820 (payment instruction/remittance).

Fritz also receives data from a customer in a proprietary format.

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Quantity of Data, Trends

Two thirds of Fritz' EDI transactions are with U.S. Customs, accounting for 40,000 EDI transactions per month.

The remaining 20,000 transactions are spread over the other trading partners with the air courier partnership accounting for the majority of the transactions.

Fritz is talking with other customers about setting up EDI relationships but since last year, its EDI transaction volume has stayed fairly steady.

Settlements

Fritz is not conducting receiving nor making EFT payments but it is talking with a few of its customers about doing so.

International, Japanese, and Government Relationships

Fritz is conducting EDI with an agent in Japan. The agent is a joint venture between Fritz and a Japanese company.

Implementation Phases

Fritz began its EDI program in 1984-85 by implementing the Automated Broker Interface with U.S. Customs.

The next EDI transaction set Fritz inaugurated was the TDCC 304 (ocean shipment information) in 1987-88.

Then Fritz inaugurated the TDCC 110 (air manifest) in early 1989 and the ANSI 810 (invoice) and the ANSI 856 (ship notice) later in 1989.

Fritz implemented EDI at the request of its customers. Top management support was critical for its successful implementation.

Processing Sequences

For the TDCC 304 (ocean shipment information) the sequences begins with receiving the 304 from exporters. Fritz then creates a bill of lading for the shipment and physically delivers it to the steamship line (this will be done by EDI one day, according to Fritz).

At the end of each month, it tallies up all exports it has made on behalf of customers. It creates an export declaration on a magnetic tape and sends this to the Census Bureau (a government body that

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collects statistics).

Fritz receives the TDCC 110 (air manifest) from a large courier service. It adds further data and then submits the form to U.S. Customs electronically via the Automated Broker Interface.

Protocol

Fritz mainframe receives the TDCC 110 directly from its customer using a 3780 bisynchronous protocol.

All other transaction sets travel through a third party network and Fritz' PC translator. The protocol used here is also a 3780.

Network Services Used

Fritz uses GEIS as its third party VAN. It uses an interconnect service to reach trading partners on other VANs.

It does not use any other services from the VAN.

Configuration

Fritz runs its DP on two Unisys A15 mainframes. Connected to the mainframes is one PC that interfaces with the VAN and performs data translation. Also, 1,100 terminals around the world in Fritz' offices are attached to the mainframes.

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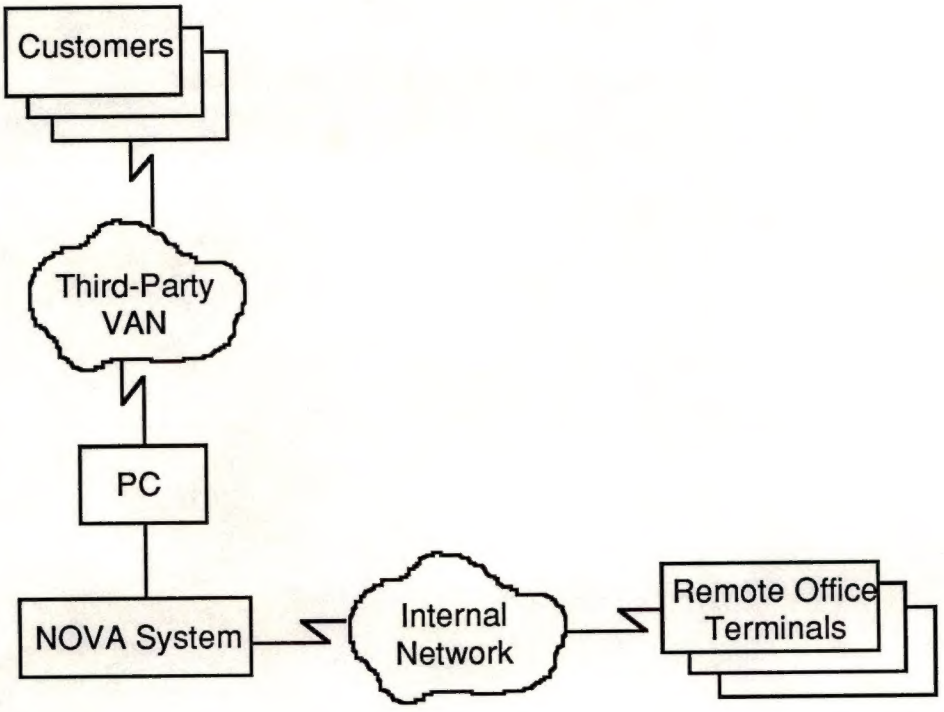
285

291.253

167

The Fritz Companies



286

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— END —